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THE

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OCTOBER, 1914

ORIGINAL ARTICLES

THE CLINICAL VALUE OF EXPECTORANTS.

By Joseph L. Miller, M.D.,

CHICAGO, ILLINOIS.

The medical literature does not contain, so far as I have been able to determine, any accurate bedside observation on the value of expectorants. There are many references of medicial men's impressions, but nowhere carefully recorded facts that will bear close scrutiny. When an investigation of this subject was first considered, after reviewing the literature, several methods were considered and tried for an accurate bedside study of the subject. It was impossible, however, to obtain satisfactory data, so this was abandoned and the work carried on with the laboratory animal; and it would appear that an accurate bedside study of the action of expectorants offers at present insurmountable difficulties. Patients with acute bronchial troubles are unsuited for study on account of the rapid and marked spontaneous changes that may occur. Those with chronic bronchitis, where the daily or even weekly variations are imperceptible, are most suited for a study of this character. In these patients, however, it is apparently impossible to determine accurately the amount and viscosity of the sputum. The admixture of saliva and the length of time the secretion has remained in the trachea or bronchi, with consequent loss of water, must all be considered.

The review of the literature is comparatively simple, as the total published information upon this subject, outside of that contained in the text-books on pharmacology, is confined to less than a half dozen monographs. The total evidence at hand, therefore, consists of purely theoretical consideration and three or four

series of observations performed upon laboratory animals, to which we have added some additional laboratory experiments.

Expectorants may be defined as agents which facilitate the removal of secretion from the air passages. Several factors play a role in this process. The act of coughing, by increasing air currents, carries upward the secretion in the trachea and larger bronchial tubes, but has no effect upon the bronchioles. In these latter the chief factor is the ciliary movements of the bronchial mucosa. It has been determined by Gebhart, Henderson and Taylor, and others that the ciliary activity is capable of carrying mucus 1.5 to 2.5 cm. per minute. Increased viscosity of the mucus interferes materially with this movement, and Engelmann has shown that it may entirely inhibit the action of the cilia. The third factor is the presence in the alveoli and smaller bronchioles of a peristaltic-like movement; this probably under vague control (Einthoven, Sandimann). These movements somewhat resembling intestinal peristalsis, are probably important factors in removing the mucus from the alveoli and terminal bronchioles, neither of which are provided with cilia. To facilitate removal of mucus it would, therefore, be necessary to stimulate coughing, increase the ciliary movements, lessen the viscosity of the secretion, or stimulate bronchial peristalsis.

The cilia are not supplied with nerves, and it is therefore impossible to stimulate them through the nervous system. Virchow, in 1854, demonstrated that the direct application of weak alkalies increased the activity of the cilia, and Rossbach claimed that alkalies by the mouth had the same effect. Cushney states that alkalies are not secreted through the bronchial mucosa, and certainly in the ordinary doses the amount so secreted must be negligible. It is, therefore, highly improbable that any of the expectorants increase the ciliary movement.

There is no evidence that any of the expectorants increase the rhythmical muscular contraction in the bronchioles. It is possible that apomorphin in large doses may stimulate the vagus and thus increase peristalsis.

The final possibility is the action of expectorants in thinning the bronchial secretion. The trachea and bronchi are richly supplied with mucous glands capable of producing a profuse secretion. The viscosity of this secretion may be lessened either by increasing the amount of secretion or by introducing into the secretion something which would dissolve the mucus, as for instance an alkali.

The expectorant action of ammonium chloride and ammonium carbonate was thought to be due to their elimination through the bronchial mucosa, the alkali thinning the secretion. This theory, however, will not bear close scrutiny. Biedl, Winterberg, and others have shown that one-half to four-fifths of the ammonia administered disappears in the liver, never reaching the systemic

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circulation. In the ordinary therapeutic dose of 0.3 gm. no more than 0.15 gm., or 2.5 grains, would reach the general circulation, and at most only a small part of this would be excreted by the bronchial mucosa, an amount certainly too small to modify the viscosity of the mucus. In case, therefore, the ammonium salts mentioned thin the mucous secretion they must act through some different channel. It is now believed that their action is upon the bronchial gland centre, which, in its activity, apparently shows a parallelism with the salivary centre. It is thought that the centre may be stimulated either directly by substances in the blood or reflexly from the stomach and mouth. Biedl and Winterberg have shown that in order to stimulate this centre in dogs it requires 2 to 2.5 mg. of ammonium salts per 100 gm. of blood. They found that when injected intravenously into a 7 kilo dog 0.48 gm. of ammonium chloride was required, and if given by the mouth twice this amount, equivalent to about 9 gm. in a man.

Turning to a consideration of the experimental work performed with ammonium salts, Rossbach, in 1882, endeavored to determine the amount of tracheal secretion in cats by exposing the interior of the trachea by means of a longitudinal slit and then observing the secretion directly. The exposed mucosa was dried with filter paper and the time noted in which secretion occurred. Drugs were then given and the secreting time again observed. He used large doses of ammonium carbonate, 2 gm. intravenously, and reported a definite delay in the secretion time. He also failed to increase secretion by painting the mucosa with a 1 per cent. solution of ammonium carbonate.

Calvert, in 1896, repeated Rossbach's experiments with quite different results. He refers to only two experiments, both on cats. He reports that after the intravenous injection of 2 gm. of sodium carbonate there was a shortening of the secretory time of one minute. Considering the method employed, namely, the covering of a previously dried surface with a secretion, this difference in time is too slight to enable us to draw any conclusions. Henderson and Taylor call attention to the late appearance of the secretion in one of Calvert's cases, thirty-seven minutes, as after an intravenous injection the effect should be noted within ten or twenty minutes. The possibility of such a surface being moistened by secretion carried up from below by the cilia makes another probable source of error.

Henderson and Taylor, in 1910, studied the action of expectorants by the following method: Cats were anesthetized with chloroform or ether, or both. This was followed by urethane, which kept the animal asleep during the period of observation. One limb of a Y-tube was fastened into the trachea, another to a calcium U-tube and the other limb to the blast side of a Meyer respiratory pump, the exhaust end of which was attached to the other end of the calcium

U-tube. The animal was placed upon its belly on an incline to assist in the escape of mucus. By this method not only the mucus but the water also contained in the expired air was estimated. This latter factor apparently introduces an element of error, as they found it varied with the temperature of the animal, the amount of air forced into the lung, and the state of the animal's circulation. They reported that ammonium carbonate or ammonium chloride in large doses given intravenously equivalent to 12 gm. for a 70 kilo man, caused marked increased secretion of mucus. Two and a half times this dose, an equivalent of 30 gm. for a man, given by the mouth, also caused increased secretion. Doses of 40 mg. of ammonium carbonate intravenously, equivalent to 1 gm. in man, at times failed to produce any increased secretion. In one instance 50 mg. of ammonium chloride intravenously, euqivalent to 1.25 gm. in man, failed to increase secretion. The dosage with which they obtained results was far in excess of that usually employed by the clinician, and therefore it may be said that they have not shown that in man these drugs in the ordinary therapeutic dose acts as expectorants. When they obtained results the increased secretion appeared in about ten minutes and was transitory in character, rarely lasting more than twenty minutes.

On account of the conflicting reports upon the action of the ammonium salts on bronchial secretion the following experimental work was carried out. Oblong pieces of filter paper of uniform weight and size, 6 x 12 cm., were rolled in such a manner so as to fit into the trachea and still leave a lumen of about 1 cm. Dogs averaging about 7 kilos were anesthetized by giving 5 gm. of chloretone in alcohol. The trachea was then severed transversely, just below the larynx, all bleeding stopped by means of the cautery, and a weighed rolled filter paper introduced. This came in close contact with the mucosa for a distance of about 6 cm. Such a filter was left in place ten minutes, then reweighed, and the increase taken as an index of the amount of secretion from the mucosa. This should also include some of the moisture in the expired air and mucus carried up from below. After two control readings of ten minutes each the ammonium carbonate in moderate doses was injected directly into the duodenum, and then another series of readings was taken, each of ten minutes, and continued for thirty minutes or more. Four animals in all were used.

The following results were obtained with ammonium carbonate:

Dog I, 7.2 kilos, received 5 gm. chloretone in 50 per cent. alcohol. Increase in weight of filter paper during the two control periods was 0.2 and 0.12 gm. The increase in weight after 0.3 gm. of ammonium carbonate for three periods of ten minutes each was 0.18, 0.14, 0.16 gm. respectively.

Dog II, 6.5 kilos, received 5 gm. chloretone in 50 per cent. alcohol. Increase in weight of filter paper during the two control periods

0.9 and 0.4 gm. respectively. The increase in weight after 0.25 gm. of ammonium carbonate for three ten-minute periods was 0.4, 0.4, and 0.4 gm. respectively.

Dog III, 7 kilos, received 5 gm. chloretone in 50 per cent. alcohol. Increase in weight of filter paper during the two control readings 0.19 and 0.17 gm. respectively. The increase in weight after 0.5 gm. of ammonium carbonate for three periods was 0.17, 0.16, and 0.17 gm. respectively.

Dog IV, 7.5 kilos, received 5 gm. of chloretone in 50 per cent. alcohol. Increase in weight of filter paper during the two control periods was 0.2 and 0.14 gm. respectively. The increase in weight after 0.25 gm. of ammonium carbonate for three ten-minute periods was 0.14, 0.12, and 0.12 gm. respectively.

These experiments show that at least by the method pursued ammonium carbonate in what would be called moderate laboratory doses for a dog does not increase bronchial secretion. The dosage varied from 0.25 to 0.5 gm., equivalent to 2 to 4 gm. for a 65 kilo man, an amount considerably in excess of the ordinary therapeutic dose.

Both experimental and clinical evidence would indicate that the iodides cause increased secretion of bronchial mucus. Henderson and Taylor, from their experimental report, believe that this must be due to reflex stimulation of the bronchial centre from the stomach, as in their experiments iodides used intravenously did not modify the bronchial secretion. The iodides, as shown by Baehr and Pick and others, also cause dilatation of the bronchioles. It is possible this may play some role in facilitating the removal of mucus.

Many of the drugs having an emetic action also act as expectorants. Attention has already been called to the apparent intimate relation between the salivary and bronchial gland centre. The most important members of this group are apomorphin and ipecac. Both of these in non-emetic doses are supposed to cause increased bronchial secretion. Apomorphin probably acts chiefly by direct stimulation of the bronchial gland centre; ipecac both centrally and reflexly from the stomach. These drugs when pushed to the point where they have an emetic action may possibly through their vagus action also cause increased peristalsis of the smaller bronchioles. Senega, according to Henderson and Taylor, probably acts as an expectorant by effecting the bronchial gland centre reflexly from the stomach. Pilocarpin stimulates the bronchial glands directly.

Rossbach, Calvert, and Henderson and Taylor agree that ipecac and apomorphin act as expectorants in animals. Calvert failed to obtain results with senega, but Henderson and Taylor produced marked increased bronchial secretion in cats. Henderson and Taylor also obtained positive results with antimony and tincture of squill. The uniformity of these results leaves no doubt that in

the doses used these drugs act as expectorants on dogs and cats. Henderson and Taylor call attention to one point, namely, that the bronchial gland centre is easily depressed and then fails to act. Especially with apomorphin a slight excess in dosage by depressing this centre would lessen bronchial secretion. They raise the question whether in diseased conditions with marked circulatory disturbance the bronchial gland centre would react as in the normal.

The dosage employed in all this experimental work was quite large. Henderson and Taylor gave 1 c.c. of the fluidextract of ipecac intravenously and 2 c.c. of the wine of ipecac by the mouth to a 2¼ kilo cat. This would be equivalent to 25 and 50 c.c. in man. This dose is, of course, far in excess of that employed clinically. Their results with senega and quill were obtained by using 2 c.c. of the tincture of each in a 2.5 kilo cat: here, again, doses far in excess of that employed in man. They have not, therefore, proved that any of these drugs are active in the ordinary therapeutic doses, which after all, from a clinical standpoint, is most important. For this reason we thought it desirable to repeat these experiments, using moderate doses.

The expectorant action of ipecac and apomorphin was tested on four dogs. The method of procedure differed very slightly from that used in the experiments with ammonium carbonate. After severing the trachea the roll of filter paper was introduced into the upper portion rather than the lower, as in the previous experiments. This method offers two advantages: (1) that absorption of moisture from the expired air is avoided; and (2) only mucus from the surface in contact with the filter paper is obtained, as in the previous method much mucus may be carried upward by ciliary action.

Chloretone was employed as an anesthetic in three of the animals, urethane in one. The emetin was injected directly into the stomach, the apomorphin into the duodenum. In each instance the filter paper was allowed to remain in contact with the mucosa ten minutes. Two control readings were taken before administering the drug. Readings were taken for at least forty minutes after giving the drug, which should be sufficient time to permit of a physiological action occurring.

The following results were obtained with emetin hydrochloride:

Dog V, 7.8 kilos, received 5 gm. of urethane and 2 gm. of chloretone in 20 c.c. of 50 per cent. alcohol. Increase in weight of filter paper during the two control periods 0.65 and 0.69 gm. respectively. The increase in weight after 4 mg. of emetin hydrochloride for three periods of ten minutes each was 0.262, 0.0525, and 0.0495 gm. respectively.

Dog VI, 6.7 kilos, received 5 gm. of chloretone in 20 c.c. of 50 per cent. alcohol. Increase in weight of filter paper during the two control periods was 0.0613 and 0.062 gm. respectively. The

increase in weight after 4 mg. of emetin hydrochloride, for three periods of ten minutes each, was 0.058, 0.056, and 0.05 gm. respectively.

The following results were obtained with apomorphin sulphate:

Dog VII, 9 kilos, received 2.5 gm. of chloretone in 15 c.c. of 50 per cent. alcohol. Increase in weight of filter paper during two control periods was 0.08 and 0.0746 gm. respectively. The increase in weight after 2 mg. of apomorphin for three periods of ten minutes each was 0.0727, 0.0664, and 0.0643 gm.

Dog IX, 8 kilos, received 5 gm. of chloretone in 20 c.c. of 50 per cent. alcohol. Increase in weight of filter paper during the two control periods was 0.06 and 0.055 gm. respectively. The increase in weight after 2 mg. of apomorphin sulphate was 0.054, 0.058, and 0.055 gm. respectively.

It will be noticed that the first reading in each instance was considerable higher than the subsequent ones. This can probably be accounted for by mucus which had collected in the trachea, and, therefore, does not represent the real secretion during the period. At the beginning of the experiment there was frequently slight bleeding from the severed end of the trachea; this added to the weight of the filtered paper.

The apparently much greater secretion of mucus in Dogs I to V in both controls and after receiving the drug was due to the roll of filter paper being introduced in the lower segment of the severed trachea, so that much of the mucus on the filter paper was carried up by the cilia from below and also from moisture in the expired air. The filter paper was introduced into the upper end of the trachea in Dogs VI to IX, the increase in weight here probably being due almost entirely to mucus secreted from the surface covered by the filter paper.

I wish to express my appreciation of the valuable suggestions and assistance rendered by Prof. A. P. Matthews, of the University of Chicago.

SUMMARY. Ammonium carbonate and ammonium chloride and the emetic group of expectorants, as apomorphin and ipecac, when given in sufficiently large doses to animals, increase bronchial secretion. Ammonia salts per os, in moderate doses equivalent to 2 mg. in an adult man, do not increase bronchial secretion in the dog. Apomorphin and emetin when given to dogs in doses considerably greater than the ordinary therapeutic dose for man do not excite increased bronchial secretion.

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RELATIVE PULMONIC INSUFFICIENCY.

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In the study of the valvular diseases of the heart, a general agreement among clinicians may be noted in almost every field excepting the one we are to study.

Mackenzie, Dieulafoy, and many other writers do not even mention in their text-books the possibility of relative insufficiency at the pulmonary orifice. Jurgensen was evidently familiar with the murmur, but apparently failed to interpret it correctly. He states,[1] in describing the different types of murmur to be found in mitral stenosis, that "the diastolic murmur is also heard at times in the second left intercostal space, in the region of the pulmonary artery or a little outward from that point. At times the murmur is heard a little more distinctly in that locality than at the apex, especially when a systolic murmur is also present at the latter." It is certainly a most striking circumstance that he describes so closely the murmur we study in the very type of case in which it is most frequently noted. He makes no direct mention elsewhere of the lesion we are considering.

Among the authors at hand who mention the phenomenon definitely are Colbeck, who states that "relative incompetence of the pulmonic valve does sometimes occur, but the lesion is decidedly rare. It . . . may obtain in cases of mitral stenosis."

Satterthwaite states that "temporary insufficiency is doubtless of common occurrence."

Osler[2] says that "both Gibson and Graham Steell have called attention to the possibility of leakage through these valves in cases of great increase of pressure in the pulmonary artery, and to a soft diastolic murmur heard under these circumstances, which Steell calls "the murmur of high pressure in the pulmonary artery."

[1] Nothnagel's Encyclopedia, Diseases of the Heart.

[2] Eighth edition.

Allyn[3] says that "it is probable that relative pulmonary insufficiency occurs more frequently than we are wont to believe."

Further quotation of authorities would simply emphasize the lack of unanimity of opinion as to the possibility and frequency of the con lition.

Gibson's experiments should be quoted in order to show the reasonableness of the diagnosis of relative insufficiency under conditions of high pulmonary arterial pressure. "In the healthy human heart much fluid escaped (from the pulmonary orifice) with a pressure above thirteen inches, a small amount between thirteen and eight inches, and none below that pressure. We have no direct means of estimating the pressure in man. The results of animal experiments give as the mean pressure, 17.6 mm. of mercury in the cat, 12.07 mm. in the rabbit, and 29.6 mm. in the dog (Bentner). Eight inches of water is equal to about 15 mm. of mercury, so that the pressure in the pulmonary artery in man at the height of a vigorous systole of the right ventricle may cause a pressure well above that which first begins to cause insufficiency.[4]

Analogy would lead us to expect to find relative leakage here as at other valves, and it is therefore difficult to undertand the position of certain authors who ignore the existence of the condition, or virtually state that it does not occur.

Personally, I regard relative pulmonary regurgitation as being a not very infrequent complication of advanced mitral stenosis and extensive fibroid phthisis, and as being occasionally found in other conditions in which the pulmonic tension is high.

In "A Clinical Study of Six Hundred Cases of Heart Disease"[5] I found the murmur in question present three times in association with mitral stenosis: once in association with double mitral disease, and once in association with combined aortic and mitral regurgitation. The total number of cases of simple mitral stenosis studied in this series was 35, while 44 cases presented double mitral murmurs. We may safely assume, I believe, that if the signs and symptoms to be mentioned warrant the diagnosis of relative pulmonary insufficiency the affection may probably be found in possibly from 3 per cent. to 5 per cent. of cases of mitral stenosis. My experience before and since the gathering of the statistics quoted (between 1903 and 1909) confirms me in this opinion.

The diagnosis rests upon the association of the following findings:

1. Some definite cause for increased pulmonary tension, notably mitral stenosis or fibroid phthisis in an advanced state.

2. The presence of increased precordial area of dulness, especially suggesting dilatation of the right ventricle.

3. The presence of a soft diastolic murmur heard at the region of the pulmonary valves, and transmitted downward from the

[3] Amer. Jour. Med. Sci., October, 1913, No. 4, cxlvii, 54.

[4] Quoted from Osler's System of Medicine.

[5] Med. Record, November, 13, 1909.

second or third left intercostal space along the left side of the sternum. The murmur is exactly of the type found in aortic regurgitation, excepting that it is generally more soft and blowing in character. The most striking single feature is the inconstancy of the murmur. After being present for days or weeks, with the regaining of a better condition of compensation, the murmur disappears, to reappear with the next breakdown. It is absolutely essential to the diagnosis that the aortic valve sounds be clear and that no feature of aortic regurgitation be present. Fortunately, the insufficient filling of the left ventricle in mitral stenosis oftentimes renders the aortic second sound so notably feeble that the pulmonary signs are prominent by contrast.

4. Absence of thrill. This is not infrequent in the organic lesion, but is, I believe, never found in relative insufficiency, and should therefore count against such a diagnosis. The presence of a systolic murmur at this orifice would militate against the diagnosis of relative leakage and be in favor of the organic type.

5. The murmur may be increased in intensity by expiration, especially with the closed glottis, the increased intrapulmonary pressure being the active agency in bringing about the exaggeration of the murmur. A similar increase may be noted after exertion.

As is to be expected, the pulmonary second sound is commonly enfeebled by the failure of close apposition of the pulmonic leaflets.

Of the considerable number of cases which I have seen I shall quote but two.

Case I.—Male, aged twenty-seven years, complained of dyspnea and cough, the former of extreme severity. Cyanosis was present at various times while under observation. Edema finally appeared. The heart was much increased in area, the apex-beat being found 12 cm. to the left of the central line, with marked presystolic murmur and thrill. A soft diastolic murmur was found extending downward from the third left interspace. This disappeared under rest in bed and the administration of digitalis. There were none of the features of aortic regurgitation.

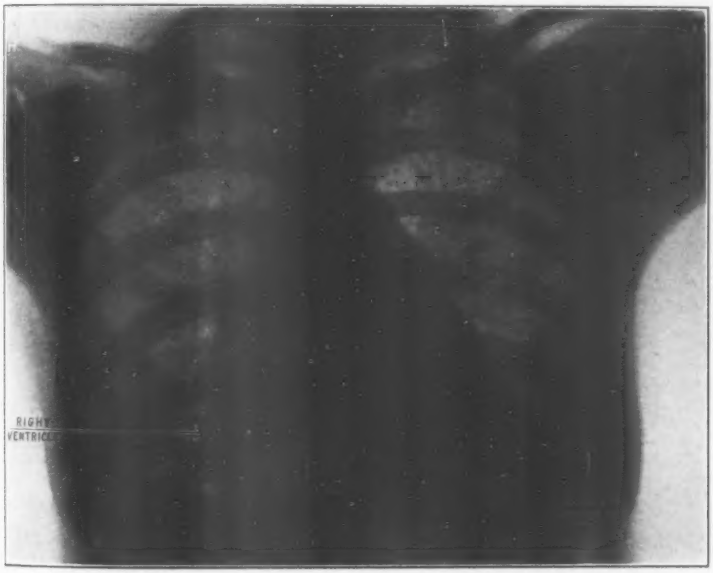
The patient later passed through an attack of acute pneumonia, the murmur reappearing. Recovery ensued, this being one of the few cases I have known of recovery from acute pneumonia in advanced mitral stenosis. Within a year the patient died of cardiac incompensation. The postmortem examination showed a marked "buttonhole" mitral valve, with hypertrophy and extreme dilatation of the heart. The aortic, tricuspid, and pulmonic valves were normal.

This case was shown at a meeting of the Denver County Medical Society, and the presence of a murmur of the character described was verified by many of those present.

Case II.—A female, aged thirty-three years, had suffered twice from acute rheumatism. She presented at the single examination which I had the opportunity of making, enormous dilatation of

the heart, the transverse diameter of the precordial flatness being 20 cm. The great increase in this direction is well shown in the accompanying skiagram, for which I am indebted to Dr. G. H. Stover. A loud presystolic murmur was present at the apex, with presystolic thrill. At the pulmonic area there was heard a diastolic murmur such as we have described, transmitted downward, and increased in intensity by exertion.

The aortic second sound was notably feeble, and no signs of aortic insufficiency existed. In the skiagram may be noted at *a* the marked dilatation of the right ventricle, and the general increase in area in a transverse direction as mentioned above (60 per cent according to Dr. Stover's measurements). In the absence of post-mortem proof in this case we can, of course, make only a presumptive diagnosis of relative insufficiency.



Skiagram of Case II, showing increased transverse diameter of the dilated heart.

In view of the evidence of mitral obstruction, of the pulmonic diastolic murmur, increased in intensity upon exertion, absence of thrill, absence of signs of aortic disease, feeble aortic second sound, the known rarity of organic pulmonary regurgitation and the entire reasonableness of a diagnosis of relative leakage at the valve mentioned under conditions of marked increase in the tension of the pulmonary circulation, the diagnosis in this and similar cases, in my opinion, rests upon as secure a basis as that of the other valvular diseases of the heart.

THE PREVENTION AND TREATMENT OF VULVOVAGINITIS IN CHILDREN.[1]

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The 66 cases of vulvovaginitis upon which this report is based occurred sporadically during the past eighteen months in girls varying in age from three weeks to twelve years, most of whom were referred from the St. Louis Children's Hospital Dispensary to the Washington University Gynecological Dispensary for treatment. Forty-three of these patients were investigated as to home conditions, possible source of infection, etc., by the social service department of the Children's Hospital. My thanks are due to Miss Stimson, the head of the department, and to Mrs. Marshall, who investigated most of the cases, for their kind coöperation and assistance. I also wish to thank Dr. Stewart, of the department of hygiene of the Board of Education, and the Visiting Nurses' Association for the assistance given me in the treatment of a large number of these cases.

The importance of gonorrheal vulvovaginitis in children lies not merely in the physical discomfort and occasional serious complications resulting therefrom, but in the moral shock produced upon the child and the family by the occurrence of this loathsome disease in the midst of the innocence of infancy and childhood. Possibly because it occupies a sort of midway position between pediatrics and gynecology, few specialists have given this disease the serious consideration it merits. The epidemics of vulvovaginitis that have from time to time invaded children's hospitals and institutions have aroused pediatricians to the contageousness of this infection. The profession at large has not, however, seemed to realize that a condition so infectious in institutions must also be frequently transmitted from child to child, or through some other agency, outside of such hospitals or institutions. Particularly in schools, in tenements, in public playgrounds, etc., wherever children congregate in considerable number, and the same lavatories, towels, etc., may be used, we have conditions favoring infection. That the disease is far more common than was formerly supposed is being generally recognized. Seippel[2] estimates the number of cases occurring annually in Chicago at 500. Pollock[3] believes that from 800 to 1000 girls are yearly infected in the city of Baltimore. The number of cases in this report coming from practically one

[1] Read before the St. Louis Medical Society, May 9, 1914.
[2] Cited by E. R. Spaulding, Amer. Jour. Dis. Children, 1913, v, 266.
[3] The Acquired Venereal Infection in Children, Bull. Johns Hopkins Hosp., May, 1909, xx, 142.

source in eighteen months is evidence of the prevalence of this disease in St. Louis. Furthermore, Dr. Jeans, the resident pediatrician of the Children's Hospital, undertook over a period of five months a routine examination of all children coming to the Children's Hospital Dispensary to determine how frequently this condition passed unrecognized; 262 girls over one year old were examined, and whenever any moisture or secretion was seen it was examined for gonococci; 14 children were found to be infected, that is to say, about 5.3 per cent. of all girls coming to the dispensary. Only a small number of the 14 children in whom the infection was found came on account of the discharge.

ETIOLOGY. While in three of the cases that came under my observation the absence of gonococci and the character of the vaginal discharge and the rapidity with which it cleared up indicated some infectious or irritative condition outside of gonorrhea the remaining cases all showed at one time or another gonococci in the secretions. For practical purposes, therefore, vulvovaginitis should be termed gonorrhea. A correct appreciation of the etiological factors can only be obtained by considering the anatomy and histology of the lower genital tract in girls before puberty. Why is it that we find these infections not transmitted to little boys or to girls beyond puberty or to adults? The gonococcus grows most rapidly upon delicate squamous or cylindrical epithelium. Such delicate epithelium is found about the vulva and vagina in little girls, whereas in adults the epithelium is much denser and more resistant. Unfortunately the external genitals of girls are, so to speak, bare and everted before puberty, offering the best possible nidus for infection. With the increase in size of the labia majora, and above all the development of a hairy covering at puberty, the vestibulum vaginæ is shielded from direct contact with the outside. In none of the cases that came to our clinic where we could exclude the possibility of sexual contact was there found any girl who was beyond puberty. This corresponds to the reports of other investigators.[4]

In analyzing the possible causes of this infection we must consider first the source, and secondly the manner of transmission. I realize of course the great difficulty of trying to analyze the various factors that deserve consideration, and feel that while we may have presumptive evidence along certain lines it is almost impossible, except in a few cases, to get absolute proof. The first question is whether the parents are the source of infection? Investigation showed that a large majority of these parents had had two or more children, that the mothers in only a few cases gave a history of a discharge, and that where a vaginal examination was made it was usually negative. In two instances, however, the mothers showed

[4] Spaulding, loc. cit.; W. Hamilton, Gonococcus Vulvovaginitis in Children, Jour. Amer. Med. Assoc., April 9, 1910, i, 1196.

an acute gonorrhea preceding the infection in the child, and here she was probably the infecting agent. Other possible sources of infection are older brothers and sisters, other persons living in the same house or using the same lavoratory, and finally other already infected girls of the same age. The last-named focus of infection is, as I will later try to show, the most important factor in the spread of the disease.

Now as to the manner of transmission. In only four children did the question of rape come up for consideration. In no case was there any external injury indicating this as likely. In one instance the mother accused a boy of sixteen as being responsible for the infection. He was arrested and an examination showed that he had not the slighest evidences of gonorrhea. German writers lay some stress upon the superstition among the lower classes abroad that an adult infected with gonorrhea can be cured by transmitting it to some innocent child. In none of my cases did this seem a probable explanation, and I was particularly impressed by the fact that only a few girls came from the ignorant, foreign-born population.

Etiological studies of the epidemics in children's hospitals indicate that the hand of the nurse may at times be a factor in the transmission of the infection. In how far can we consider this as of importance in the cases appearing sporadically in homes? Is the hand of the infected mother an important factor in transmitting infection to her child? I believe not. The small percentage of mothers who had a gonorrheal infection has already been noted. Even stronger evidence against this manner of infection lies in the fact that only two of our cases occurred in children under one year of age. Now just at this time the epithelium is most delicate and susceptible to infection, and the mother a dozen times a day is compelled to handle the genitals of the child. The relative absence of infection during these first twelve months speaks strongly, therefore, against the frequency of this manner of transmission.

Next we must consider the transmission through cloths, either in the form of clothing, towel, wash cloth, or bedlinen. The gonococcus, as is well known, is particularly susceptible to drying. While I am far from denying that this manner of transmission, especially through bedlinen, occurs from time to time, we must realize that cloth will absorb considerable of the secretion, and in the course of ten to fifteen minutes will ordinarily be dry enough not to be a serious source of infection.

We have yet to consider the bath and the lavatory as a means of transmitting infection. In institutions where a number of children are bathed one after the other it is readily possible that infection may be carried from one to another. We are, however, primarily concerned in this paper with the home cases, and here the greater interval between baths make the spread of gonorrheal

infection through this agency unlikely. In this country public baths are few in number, and usually consist of showers or a swimming-pool, where contamination of this sort would be uncommon.

In the lavatory seat, however, we have factors favorable for spreading this contagion. Secretion containing gonococci deposited here will, owing to the moisture of the surrounding air, remain a long time undried and virulent. Moreover, lavatories, even in grammar schools, are, as a rule, so high that the smaller children in using them are forced to have their genitals and clothing rub over a considerable portion of the seat. The greater the number of persons using the same lavatory the less interval of time is apt to elapse between its use, and hence the greater likelihood of carrying infection. The lavatory seat of the tenement-house districts is hence a source of great danger for little girls, particularly where it is rough or unclean. In the public schools, where at recess there is practically no interval in the use of the lavatory, the danger is even greater. Of course if we could keep all the infected girls from attending school the danger would be eliminated. We found, however, that a number of girls did not seek medical advice until after a profuse discharge had been present for several weeks, and that a number of lighter infections passed unrecognized and untreated for months. With the open formation of the genitals in girls and the unnatural high seat of the lavatory it is impossible for an infected child to avoid contaminating the seat with some of her discharge. I have not given figures regarding etiology from the social service investigation of the cases, because the evidence on which they were based varied so much in reliability. In some instances it was merely the statement of the mother. Where, however, we have record that a child of five years, whose parents, brothers, and sisters were free of gonorrhea, whose home lavatory was immaculate and used only by the family, became infected one and a half months after attending school, the interpretation can hardly be questioned. Furthermore, it is rather striking that in my own tabulation, as given below, 47 out of 66 girls were of school age or over.

Less than one year, 2; one to three years, 13; four to six years, 23; seven to nine years, 19; ten to twelve years, 9; total 66 cases.

I think, therefore, that it can be fairly said that the most frequent source of infection is from child to child, and that the most common manner of its transmission is through the school lavatory. This is in no wise a reflection upon the cleanliness of the public schools, but merely the result of special factors predisposing to contagion.

Home Conditions. While no portion of the city was exempt from this infection, not even the fashionable parts of town, the social service investigation revealed the fact that a majority of the families were of the poorer classes and lived in cramped quarters. Of the homes examined fifteen were extremely neat and clean,

ten were unsanitary in some respects, and nine of them were filthy. Only 11 of the 66 were colored girls. In the poorer homes and tenements there was usually one lavatory for the whole building used by everyone, and at times in bad condition. It was also common to find that the infected child slept with the mother or with a brother or sister. Until the social service worker or the visiting nurse visited the home there was usually not the slightest attempt at limiting the infection, and in three instances the result was that a sister of the patient had become infected.

Symptoms. Few of the girls had pronounced discomfort. In the acute stage there was some increased frequency and burning on urination and a vaginal discharge. Usually, however, it was the mother who first noticed a yellowish stain upon her child's clothing, and on inquiry discovered the disease. Some children had a temporary enuresis during the active stage. At times the child would complain of feeling chafed. The course of the disease was almost invariably prolonged. Complications occurred rarely. Twice there was a gonorrheal proctitis, resulting from the use of an infant syringe for constipation. One patient had an attack of severe abdominal pain with fever and tenderness lasting one week, which in all likelihood was due to a tubal involvement. Two girls developed an ophthalmia, and one of these two likewise had an arthritis.

Treatment. So unsuccessful have been most of the methods of treatment suggested that some believe as much can be accomplished by simply leaving the cases alone. While realizing all the difficulties, I feel that such pessimism is not justified. Doubtless the general condition of the patient is an important factor. Fresh air, good food, and an iron tonic aid materially in effecting a cure. One child that had been under our care for almost a year, with but little relief, was cured by a summer in the country. In the acute infections, rest in bed, preferably in a hospital, supplemented by instillations of 25 per cent. argyrol give the best results. This should be supplemented by hexamethylamine, gr. i to iv, t.i.d. As to vaccine I agree with Dr. G. G. Smith,[5] who recently stated: "We have not used vaccines, nor do we believe their employment in gonococcic infection of the mucous membranes, whether in the male or in the female, has up to the present given sufficiently satisfactory results to warrant any dependence on them."

An extended trial was made of the effect of the lactic acid bacillus. The tablets made by Parke, Davis & Co., were crushed and about 5 grains of the powder made into a small vaginal cocoa-butter suppository. The insertion of these suppositories was at times attended with some difficulty. These treatments were given three times a week for six to eight weeks. In three out of the ten cases in which this treatment was used there was a temporary

[5] Treatment of Gonococcic Vulvovaginitis, Amer. Jour. Dis. Children, March, 1914.

cessation of discharge. In the other cases the result was so questionable that this form of treatment was abandoned.

I abstained from using the dry powder treatment with bolus alba[6] and xerase,[7] partly because of the numerous failures in the hands of others, but mainly because it is anatomically impossible of application. I had the same anatomical objections to the use of the vaginal douche in children. The corrugated surface of the vagina in these patients offers little if any opportunity for the effective use of either powders or irrigations. Moreover, we have but rarely sufficient discharge in the vagina to justify a douche. A more rational method to my mind is the repeated instillation, under slight pressure, of a small quantity of a somewhat stronger antiseptic solution. For this purpose I used the ordinary small rubber-tipped urethral syringe, pressed tightly over the hymeneal orifice. In accordance with the age of the child, from 15 to 60 drops of the solution are injected several times in succession. This balloons out the folds of the vagina and allows the solution to come in contact with every portion. While I favor the less irritating silver preparations in the very early stages, I found it best to go over as soon as possible to a 1 per cent. silver nitrate solution. In the last twenty-one cases treated over a period of five months I have been using 2 per cent. and even 4 per cent. silver nitrate solutions. It is surprising how little burning these stronger preparations caused and how satisfactory were the results obtained in the chronic cases. The 2 per cent. silver nitrate solution was used in girls under five years of age, and in those over five years the 4 per cent. solution was used once or twice a week in the late stages with good effect. I find no record of the use of such strong solutions by others, and believe my favorable results and the absence of any untoward symptoms justifies a further test of this treatment. My outline of treatment for vaginitis in a girl of school age would therefore be: first two weeks, rest in bed as much as possible, 25 per cent. argyrol injected twice daily if in hospital; third to fourth week, daily instillations of 1 per cent. silver nitrate solution; fifth to sixth week, instillations of 2 per cent. silver nitrate solution every other day; seventh to tenth week, instillations of 4 per cent. silver nitrate solution twice and later once a week. Finally if there is no more discharge for over a month, send to the country for one to two months without treatment.

Any form of treatment, however, will fail if it is not carried out systematically over a long period of time. Mattisohn[8] complains that his results were frequently spoiled because parents failed to bring their children regularly. To overcome this I secured last

[6] Nassauer, rev. in Zeitsch. f. Kinderheilkunde, 1913, iv, 111.
[7] Cronbach and Tojbin, rev. in Zeitsch. f. Kinderheilkunde, ii, 224.
[8] Die Prognose der Vulvovaginitis Gonorrhoica Infantum, Archiv f. Dermatol. u. Syph., cxvi, 817–840.

November the assistance of the Visiting Nurses' Association. On Saturdays the children were seen at the dispensary, treatment given, and the nurse who was present instructed in the home treatment for the coming week. Every day or every other day, depending on the case, the nurse gave the treatment at home and reported anything unusual to me. During the previous year, when we had no such system, we found that the mother soon tired of bringing her child until a bad relapse again forced her to have something done. Such haphazard treatment is hardly better than none at all.

Prognosis. The results of treatment are difficult to judge because of the impossibility of saying whether a case is cured or not. The results of Dr. Smith's[9] complement-fixation tests, particularly his second report published in March, 1914, indicate that even with this test we are at a loss to say positively when a cure is effected. This is, however, very different from denying the possibility of cure. Mattisohn[8] has shown that even without active treatment eighteen out of thirty-one girls, after a period of two to five years, showed no discharge or gonococci, and that with active treatment about 75 per cent. should be cured in three to four months. Insufficient time has elapsed to state the outcome of a majority of our own apparent cures.

About 150 slides of vaginal secretion were examined microscopically in the course of the weekly treatments of the 19 cases that came to the dispensary since November 29. These slides were taken from every case once a week and brought out a number of interesting points: the frequency of recurrences or slight exacerbations, the change from a purulent to an epithelial discharge, the variation in bacterial flora, etc. I was repeatedly surprised how in the presence of but little discharge numerous intracellular gonococci were found. One typical record will serve to illustrate the course of the infection:

Dora W., aged three years. Smears showed:

November 29. Considerable pus, some intracellular and extracellular gonococci. No other bacteria. A few epithelial cells.

December 6. Considerable pus. Still a few intracellular gonococci.

December 13. A few leukocytes. Much epithelium. No gonococci.

December 20. Some pus. Considerable epitheliun. Many bacteria, a few extracellular gonococci (?).

December 27. A few leukocytes. Epithelia abundant. A few extracellular diplococci.

January 3. Increased pus, some epithelium. A few intracellular gonococci.

[9] Complement-fixation Test in Gonorrheal Vulvovaginitis, Amer. Jour. Dis. Children, 1913, v, 313–316.

January 10. Epithelium abundant; no pus; many bacteria.
January 17. Epithelium abundant; few bacteria.
January 24. Only epithelium.
February 14. A few epithelia; no pus; no bacteria.
February 28. Nothing on slide.
April 11. Only epithelia.

Some say these exacerbations of gonorrhea are due to reinfection, but this seems very unlikely. Usually the microscope has still shown some leukocytes present, even though there was no visible discharge. The isolation employed would exclude the possibility in most of our cases of reinfection as a cause. That there is a chronic nongonorrheal vaginitis following upon the wake of the true infection, as claimed by Smith,[4] characterized by a chalky discharge, consisting almost wholly of epithelial cells, my examinations would corroborate. I do not think all these cases should be classed as uncured.

The ultimate danger to the child through this infection is difficult to estimate, although it probably rarely amounts to much. Yet every now and then we come across a case like the following:

Miss W., aged twenty-five years, consulted me May 11, 1914. She had had, ever since five years of age, some frequency of urination and a vaginal discharge. Was treated for pinworms by her family doctor. Dysmenorrhea since sixteen years of age. Pelvic symptoms. Examination shows hymen intact, urethra reddened, some mucopurulent vaginal discharge. Uterus retroverted. Tubes thickened, adherent, tender. Diagnosis: salpingitis and retroversion following gonorrheal vaginitis.

PREVENTION. I have left the consideration of preventive measures to the last because of its importance. Holt,[10] Spaulding,[11] and others have suggested measures for the prevention of epidemics in children's hospitals, orphans' homes, and similar institutions. These consist of the following:

1. The examination of a vaginal smear from all girls before admission to determine the presence of gonorrheal infection. If present, the children are excluded.

2. Adequate facilities for isolating institutional cases with this infection in whom the diagnosis had not been made on admission.

3. Special nurse, separate fever thermometers, vaselin, etc., for the infected children.

While strict adherence to these precautions will almost invariably prevent epidemics in institutions, it does not influence the large number of endemic cases constantly to be found in our large cities. Very little thought and energy has thus far been directed to control

[10] Gonococcic Infection in Children, New York Med. Jour., March 18, 1905, lxxxi, 521.

[11] Alice Hamilton, Gonorrheal Vulvovaginitis in Children, Jour. Infect. Dis., March 30, 1908, v, 147.

the spread of infection along these channels. Recently the Health Commissioner of New York, Dr. Goldwater, received a communication from the Superintendent of the City Schools of New York, stating that forty-eight children in the schools had been inoculated with some "loathsome disease" in the public hospitals of the city. Investigation showed that the municipal hospitals were not to blame, but that the disease was sufficiently prevalent to justify the serious consideration by the Health Department. I quote the following from his report.[12]

"That a form of vaginitis, which is bacteriologically indistinguishable from gonorrheal vaginitis, is a common condition among children in this city and elsewhere, is well known to clinicians.

"If a serious attempt were made to exclude from school all children who suffer from vaginitis, it would be necessary (*a*) to establish the machinery by which a complete physical examination of all female school children could be made; (*b*) to convince the public of the necessity of the proposed measure; (*c*) to establish the legal and moral right of the city authorities to require such an examination. Furthermore, inasmuch as the condition in question is one which, notwithstanding the most intensive treatment, often persists for months and even for years, it would be necessary to inaugurate a method whereby the education of excluded children could be continued. The only logical method would be to send private teachers into the homes of infected children.

"The questions here involved are among the most difficult and puzzling with which public health administrators have to deal. I am not aware that the problem has been solved anywhere, and can only promise, on behalf of this department, unremitting attention to it, in the hope that a working program may ultimately be formulated."

The interest of a man of Dr. Goldwater's experience in this problem will help greatly in its effective solution.

I should like to suggest the following additional preventive measures for the control of this disease:

1. *The instillation of a drop of 2 per cent. silver nitrate solution in the vestibulum vagina of all newborn girls whose mothers show evidence of gonorrhea.* I realize of course that probably not over 5 per cent. of the cases of vaginitis are infected at birth, but it seems to me that, particularly in maternity institutions, this precaution could certainly do no harm and would prevent a number of infections.

2. *Making vaginitis in children a disease reportable to the Board of Health.* It is probable that this would meet with considerable opposition at first, but since the disease is acquired innocently and usually from sources outside of the family, there could be no

[12] Cited in The Modern Hospital, May, 1914, p. 305.

question of violating professional secrecy by making such a report. If the Board of Health does not feel authorized to ask for such reports children attending the public schools could at any rate be reported to the department of hygiene of the schools so that the necessary steps to exclude their attendance during the active stage of the disease could be arranged for. Such reports to school authorities have been made by us for the last six months. I realize of course that there must be an element of compromise in this situation. We would not be justified in excluding the children from school for eight or nine months because of this disease unless there existed a special school, like the Frances Juvenile Home, in Chicago, where children with this disease could be given the necessary instruction. In St. Louis I have adopted the plan of allowing the children to return to their school work after about two months' treatment, provided there has been no visible discharge for several weeks. The teacher is, however, notified by the visiting nurse that the child is not to use the school lavatory. The nurse also sees to it that the child reports to the dispensary, at first once a week, later twice a month for reinspection over a period of five months. In case of any recurrence the child is kept out of school again until the active stage has completely subsided.

3. *Instruction of parents of infected children through the visiting nurse regarding preventive measures to limit the infection.* These measures would include the use of separate towels and wash-cloths, sleeping in a separate bed, care as to a thorough cleansing of any contaminated clothing, and special precautions in the use of the lavatory. It would of course be best for the child to use its own vessel instead of the common lavatory.

4. *Investigation by the visiting nurse as to the probable origin of the infection in each case with a view to excluding this factor from contaminating other children in the same house.* This would include the inspection of tenement lavatories, with a report to health authorities if they were found in an unclean condition. It would also include the supervision of infected children not attending school, or not of school age, to see that proper treatment is employed.

5. *The adoption of a U-shaped seat with low bowl and other precautionary measures to prevent the spread of infection through the public lavatories in schools, playgrounds, comfort stations, and tenements.* I consider this last-named suggestion the most important of all, and there is no valid reason why it could not to a large measure be put into operation at once. Paper coverings for lavatory seats have been used for purposes of cleanliness in some of the large hotels, and their employment in public places, such as schools, playgrounds, etc., would probably diminish the chance for infection. As, however, children could not be relied upon to apply such papers properly, it would be safer to use the U-shaped seat in addition. The height of the bowl should not be over eight inches where the

lavatory is to be used by children of school age. The presence of an attendant in the school lavatories, especially during recess, would aid materially in the discovery of girls having a discharge, in the proper use of the paper covers, and in the general cleanliness of the lavatory.

Gonorrhea in adults is so intimately connected with the public morals that any marked diminution in its prevalence seems like trying to reform the universe. Gonorrhea in little girls, on the other hand, is simply the result of inadequate sanitary precautions. The fact that hundreds of little girls are innocently infected with it every year in our large cities is a disgrace to the hygienic methods of the beginning of the twentieth century. Certainly we can say of gonorrheal vaginitis in children that one ounce of prevention is worth many pounds of cure.

DIRECT EXAMINATION OF THE DUODENAL CONTENTS (ALSO BILE) AS AN AID IN THE DIAGNOSIS OF GALL-BLADDER AND PANCREATIC AFFECTIONS.[1]

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The diagnosis of gall-bladder lesions is based upon the physical findings of the upper right abdomen in conjunction with the subjective symptoms and the objective data obtained. In typical cases of gall-stone disease there is no difficulty in recognizing the affection.

The characteristic symptoms are as follows: severe attacks of sudden pain in the upper abdomen appear at comparatively long intervals or years; they radiate to the back, often to the right shoulder-blade; are intense; last a few hours, or at the utmost two to three days, and leave as suddenly as they come. Frequently hypodermic injections of morphin have to be resorted to. During the attack the liver is usually increased in size; sometimes a more or less icteric discoloration of the eyes or skin is encountered; at times pronounced jaundice exists. A slight rise of temperature is often present in some of the attacks. During the interval there is perfect euphoria.

Frequently, however, the typical picture is lacking, and here we are at a loss to determine the trouble.

Still greater difficulties are encountered in the diagnosis of pancreatic lesions. A study of the function of this important organ

[1] Read before the American Gastro-enterological Association, at Atlantic City, N. J., June 22, 1914.

has been frequently undertaken in an indirect way either by examining the feces for the trypsin ferment or the gastric contents with its returned duodenal juices after the ingestion of olive oil into the stomach (Boldyreff's method). In neither of these methods the pancreatic juice can be obtained in a pure state, and therefore cannot be studied in a comprehensive manner.

During the last four to five years I have frequently attempted to obtain the duodenal contents in a direct way in appropriate cases. Some of the results were published in 1910.[2] In the present article I shall describe some of my new experiences relating to gall-bladder and pancreatic affections. We intentionally selected merely those cases in whom the diagnosis had been confirmed by operation or in whom the further course of the disease corroborated the clinical diagnosis. For convenience we give a summary of these cases in table form:

In looking over the table the following items are worthy of consideration: Two cases of catarrhal jaundice showed the presence of mucus in the duodenal contents; the bile appeared scantily, was clear, and revealed an admixture of mucus at intervals. In 15 cases of cholecystitis with gall-stones the bile was turbid in 13; in 2, however, it was clear. In 5 cases with turbid bile the gall-stones were found at the operation. Of the 2 cases with clear bile in 1 two small stones were passed a few days later and discovered in the stool. In one case with echinococcus of the liver the bile was dark green, turbid, with some blood admixed.

Among 6 cases with pancreatic lesions the pancreatic secretion in 4 of the cases showed absence of one or two ferments, while in two with pancreatic tumors, verified by operation, the pancreatic secretion a few days prior to the operation revealed the presence of all three enzymes. Sugar was found in the urine in 2 of these cases.

In trying to utilize the experiences gained from the above table the following deductions appear justified:

1. The macroscopic appearance of the bile is of great diagnostic import. If it is golden yellow and clear it usually indicates a normal gall-bladder. When the fresh bile looks greenish yellow and is somewhat turbid it portends a diseased state of the gall-bladder, which frequently contains gall-stones. Golden-yellow bile containing mucus is frequently observed in catarrhal jaundice. A pure golden-yellow bile may, however, occasionally exist notwithstanding the presence of gall-stones (Case M.).

2. Duodenal contents containing bile and pancreatic secretions permit gauging the pancreatic function.

3. The presence of the three ferments in sufficient quantity speaks for a normal activity. If one of the ferments is constantly absent

[2] Max Einhorn, Experiences with the duodenal Contents, Jour. Amer. Med. Assoc., July 2, 1910.

CASES OF GALL-BLADDER AND PANCREATIC AFFECTIONS IN WHOM THE DUODENAL CONTENTS WERE DIRECTLY EXAMINED (1911 TO MAY, 1914).

No.	Name.	Diagnosis.	Stomach contents.	Examination of duodenal contents.						
				Date.	Amylopsin mm.	Steapsin mm.	Trypsinogen mm.	Appearance of duodenal contents.	Microscopic examination of duodenal contents.	Remarks.
1	M.	Icterus, catarrhal.		April 13, 1912	+	0	2	Yellow, mixed with mucus.		
				" 20, 1912	+	10	0			
				" 28, 1912	+	4	3			
2	K.	Icterus, catarrhal.	HCl + Ac. = 46	Feb. 14, 1914	2	8	8	Yellow, turbid; bile appears only some time after respiration; occasional blood specks; mucus.	Red-blood cells; mucus, blood pigment; crystals, bacillus pyocyaneus; bacillus coli communis.	
3	T.	Cholelithiasis; ulcus duodeni.	HCl + Ac. = 70	Feb. 25, 1913	4	0	0	Greenish-yellow, alkaline.		
4	L.	Cholelithiasis; ulcus ventriculi; appencitis.	HCl + Ac. = 80	April 4, 1913	3	1	3	Golden-yellow, clear.		
				April 20, 1913	3	5	1.5			
5	F.	Cholecystitis; atonia ventriculi.	HCl + Ac. = 30	Jan. 22, 1912	0	0	2	Yellow, turbid; alkaline.		
				" 23, 1912	10	0	2			
				Feb. 2, 1912	Trace.	+	30			
				" 17, 1912	3	0	0			
				" 21, 1912	12	+	+			
6	E.	Cholecystitis; icterus.	.....	Mar. 12, 1912	+	0	3			
				Feb. 10, 1912	+	+	+			
7	Mrs. F.	Cholecystitis; cholelithiasis	HCl + Ac. = 76	Dec. 6, 1912	2	1	0	Yellowish-green, turbid; yellow.		
				" 8, 1912	4	5	2			
				" 17, 1912	3	2	2			
8	D.	Cholecystitis; cholelithiasis; atonia ventriculi.	HCl + Ac. = 60	April 11, 1913	4	4	2	Somewhat turbid	Mycelia.	Operated.
9	Mrs. E.	Cholecystitis.	HCl + Ac. = 76	Sept. 6, 1912	12	0	2	Turbid, mucus; alkaline = 20; sp. gr. = 1008	Leucin; cholesterin crystals.	
10	Mrs. P.	Enteroptosis; cholecystitis.	HCl 0 Ac. = 26	April 4, 1914	5	3	4	Thick, turbid, dark yellow-green; yellow, turbid.	Bacilli.	
				" 7, 1914	6	1	1			
11	Mrs. R.	Cholecystitis.	HCl +	Jan. 17, 1914						

11	Mrs. R.	Cholecystitis.	HCl + Ac. = 60	Jan. 17, 1914	+	2	0.5	Yellowish green, turbid; alkaline.		
12	Miss G.	Dilatatio ventriculi; cholecystitis.	HCl + Ac. = 70	Mar. 30, 1914 " 31, 1914	20 12	1.5 15	3 10	Whitish gray, turbid; golden yellow, turbid.		
13	Miss S.	Cholelithiasis; ulcus duodeni	HCl + Ac. = 80	April 3, 1914 " 4, 1914	11 15	2 10	15 20	Turbid, greenish; turbid, yellow-green; blood present.	Boas-Oppler bacilli.	Operated.
14	Mrs. M.	Ulcus ventriculi; inanition; cholelithiasis.	.....	April 12, 1913	10	2	3	Golden yellow, clear; alkaline.		
15	Mrs. P.	Echinococcus of liver.	.....	Mar. 11, 1913	8	Trace.	5	Dark green, turbid; neutral; blood present.	Red-blood cells; bacteria.	Operated.
16	Mrs. W.	Cholecystitis; enlargement of liver.	HCl 0 Ac. = 25	Nov. 29, 1911	Present.	0	Present.	Dark green; alkalinity equals 25.		
17	J. B. D.	Cholelithiasis.	HCl + Ac. = 65	Mar. 15, 1911	Present.	Present.	Present.	Yellow, turbid; alkaline.	.....	Operated.
18	Mrs. B.	Cholelithiasis; icterus.	HCl +	Feb. 17, 1914	.....	.....	.....	Turbid, bloody; no bile; alkaline	.....	Operated.
19	Mrs. J.	Cholecystitis; pancreatitis chronica.	HCl 0 Ac. = 20	Oct. 10, 1912	Present.	Trace.	Absent.	Alkaline.	.....	Operated.
20	Dr. S.	Achylia gastrica; cholelithiasis; icterus; pancreatitis.	HCl 0 Reaction faintly acid.	Mar. 30, 1913	6	0.5	0	Faintly yellow; alkaline, turbid.	Streptococci.	Operated.
21	M. S.	Tumor of liver; pancreatitis, chronic or neoplasm; icterus.	HCl + Ac. = 40	Feb. 13, 1914	4	2	1	Turbid, white; no bile; alkaline.	Long chain; non-hemolytic streptococcus; bacillus coli communis.	Operated; urine contained bile and 2 per cent. sugar.
22	M. P. D.	Ulcer of stomach; cirrhosis of liver; pancreatitis.	HCl + Ac. = 48	Jan. 13, 1913	0	12	2	Yellow, somewhat turbid.	.....	Urine contained 1 per cent. sugar.
23	Mrs. S.	Achylia gastrica; pancreatitis, chronic.	HCl 0 Ac. = 4	Nov. 9, 1913	2	2	0	Golden yellow; bloody.		
24	W. Z.	Pancreatic tumor.	HCl + Ac. = 80	Mar. 12, 1913	Present.	Present.	Present.	Yellow, slightly turbid.	.....	Operated.

it usually indicates chronic pancreatitis. A tumor of the pancreas may, however, exist notwithstanding the presence of all the three ferments (Cases M. S. and W. Z.). This apparently surprising fact finds its explanation in the circumstance that the tumor has yet left enough healthy tissue in the rest of the pancreas to continue its function in an undisturbed manner. Similar conditions are occasionally encountered in other organs affected by growths (stomach, kidney, etc.).

4. Duodenal contents persistently revealing neither bile nor evidences of pancreatic secretion speak for a mechanical obstacle just above Vater's papilla (usually stone), as shown by Case B.

The clinical value of the direct examination of the duodenal contents in gall-bladder and pancreatic affections is therefore apparent. It will not be amiss to add a few lines with regard to the procedure.

Preparation of the Patient. The best way to obtain the duodenal contents for examination of bile is either to have the patient in the fasting condition, having inserted the tube before retiring, or else about a half-hour after the ingestion of a cup of tea with sugar or clear bouillon, the patient having taken the duodenal tube early in the morning a few hours previous to the examination.

For the examination of the pancreatic juice the same method of preparation of the patient may be applied, or any liquid diet (milk, bouillon, raw eggs), about 200 c.c., administered one to two hours previously.

Method of Obtaining the Duodenal Contents. This is usually done by aspiration. It should be performed carefully, aspirating slowly with the syringe every minute or so, with frequent intermissions.

In case the aspiration has been performed five to ten minutes and nothing has yet appeared, two means may be employed to attain the desired end: One is by the injection of secretin subcutaneously and aspirating three to five minutes later; the other consists in employing duodenal lavage. The latter is performed in the following manner: The piston of the syringe is slowly withdrawn, the empty barrel is then filled with water (blood temperature) and raised. The latter usually begins to flow into the duodenum; if it does not, slight pressure may be exerted by pushing the piston into the barrel for a half to three-quarters of a minute in order to start the flow. The piston is again withdrawn, the flow, however, continues. Before the barrel is completely empty it is quickly lowered in order to make some of the fluid return. If this fails the procedure is repeated. Admixed with the outflowing water there is usually bile present which can serve for the examination.

Absence of Bile. In our previous paper[3] we had the following paragraph regarding this point: "Occasionally we obtain on aspiration of the duodenal contents at first only a clear or slightly

[3] Loc. cit

amber-colored fluid. It is of alkaline reaction and contains the pancreatic ferments. Usually after waiting a short time, and after repeated aspirations, a golden-yellow fluid (containing bile) appears. This has no diagnostic significance. If, however, after patient waiting and aspirating only pancreatic juice but no trace of bile appears it may be of some importance, particularly in cases of chronic jaundice. If bile is present in the duodenal contents a complete occlusion of the common bile-duct can be excluded. If the bile is entirely missing and pancreatic juice is present it points to the seat of the obstruction above the common duct."

I would like to add that absence of both bile and pancreatic juice, as already stated above, speaks for a mechanical obstruction of the common duct just above Vater's papilla, thus blocking the entrance into the duodenum of either bile or pancreatic juice (Case B.). In these instances it is advisable to ascertain positively the position of the capsule end of the tube in the duodenum by the milk test or Rœntgen rays, as there is otherwise very little to go by. In one case of probable neoplasm of the pancreas with secondary involvement of the liver, not mentioned in the table, there could be found no bile in the duodenal contents after systematic aspiration, while the duodenal bucket left in the digestive tract overnight returned filled with bile, the thread likewise showing bile for several inches near the bucket. There was no jaundice present. It is difficult to explain this occurrence. Possibly the tumor in the standing or sitting postures of the patient interfered with the outflow of bile while the obstacle did not exist in the recumbent position.

DISSEMINATED SCLEROSIS.

ITS FREQUENCY COMPARED WITH OTHER ORGANIC DISEASES; ITS ETIOLOGY AND PATHOGENESIS; THE TYPES AND DIFFERENTIAL DIAGNOSIS OF THE DISEASE; ITS COURSE AND TREATMENT. A CLINICAL STUDY OF NINETY-ONE CASES.

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Disseminated sclerosis, or insular sclerosis, is a disorder which is still rarely diagnosed in this country. Nevertheless, omitting the syphilitic and parasyphilitic processes, it is the most common organic nervous disease. Byron Bramwell made the diagnosis

100 times in the examination of 5825 cases; Bruns, 70 times in 5500 cases; Williamson, of Manchester, 61 times in 2294 cases. In three successive years there were in the National Hospital for Paralyzed and Epileptics in London 2568 cases of nervous disease, of which 159 were diagnosed disseminated sclerosis.

On the other hand in 1902 the following statistics concerning the frequency of this disease in the private and hospital practice of American physicians were revealed before the New York Neurological Society:

Dana: 3000 cases (private), disseminated sclerosis, 10 cases.

Dana: 600 cases (clinic), disseminated sclerosis, 2 cases; in Bellevue, 12,000 general cases annually, disseminated sclerosis, 2 cases yearly.

Collins: 5508 cases (clinic), disseminated sclerosis, 18 cases.

Sachs: 2000 cases, disseminated sclerosis, 15 cases.

Starr: 10,056 cases, disseminated sclerosis, 27 cases.

Fränkel: In Montefiori Home in ten years, disseminated sclerosis, 18 cases.

Such statistics and others that one of us cited in detail in a paper before the Association of American Physicians in 1906 would seem to show that the disease is three or four times more frequent in Europe than it is in this country. This seems paradoxical, inasmuch as the majority of our patients seen in dispensaries and hospitals are Europeans.

In the course of examination of approximately 12,000 individuals presenting themselves as subjects of nervous diseases in private, dispensary, and hospital practice we personally have encountered disseminated sclerosis 91 times. It becomes necessary to believe, therefore, that the process is actually more common in Europe than here, but we think that this alone does not explain the extraordinary discrepancy. We believe that here the diagnosis is not made generally unless the patient presents a majority of the symptoms which constitute the classical form of the disease, whereas in Europe the diagnosis is frequently ventured even though none of the classical symptoms or signs is evident.

Despite the careful study of disseminated sclerosis that has been made, especially in Germany and Great Britian, absolutely nothing is known of its causation. In isolated instances it seems to stand in relationship to infectious diseases, to exposure, exhaustion, trauma, and other environmental circumstances. Such factors, however, act probably only by exciting some preëxisting constitutional tendency into activity, or by favoring the activity of some unknown metabolic or infectious toxin. We throw no light upon this question; few of our cases have come to the autopsy table, so we have no pathological findings to report. Our paper deals with the clinical observation of 91 cases in which after careful deliberation the diagnosis of disseminated sclerosis was made.

Etiology. The age of onset has been recorded in 85 of our cases: 10 (12 per cent.) occurred before the sixteenth year; 65 (76 per cent.) occurred between the sixteenth and thirty-fifth years; 10 (12 per cent.) occurred between thirty-five and forty-three; 88 per cent. occurred before the thirty-fifth year, almost the exact percentage of Bramwell's 110 cases (85 per cent.). The process unquestionably makes itself evident most commonly in youth and in early adult life. We have observed but 3 cases occurring before the tenth year where the diagnosis was ventured, though in none of these was the evidence conclusive. Totski claims to have found it present before the age of six in 19 cases, and other competent observers have recorded cases occurring in early childhood. The diagnosis in these early cases can scarcely be made with certainty, however. Only their subsequent career, their course and development, or the findings at necropsy can establish the diagnosis.

Heredity as a factor was not noted in any of our cases. It is not improbable, however, that close and systematic examination would have revealed neuropathic foundations in many of them. Reynolds has reported two instances in which the familial or hereditary factors were of great significance. In the first instance three children of a family developed the disease in the thirtieth, thirty-seventh, and thirtieth years respectively. In the second instance two sisters displayed the disease, one in her twenty-fifth year and the other in her twenty-ninth. Mettler reported one case of a man, aged thirty-two years, with fully developed evidences of disseminated sclerosis, whose paternal grandparents were first cousins and congenital deaf-mutes. The patient himself was the weaker of twins. Klausner reporting 126 cases of the disease found 31 in which heredity undoubtedly played a role; 28 of our patients were native-born Americans, 13 were British, 20 were Russian Jews, 13 were of scattered nationality; 60 per cent. were unmarried; males made up 57 per cent., females 43 per cent.

Causative Factors. 1. *Occupation*. In our cases we have found such great diversity of occupation that we cannot conceive any relationship between occupation and the development of the disease. Oppenheim lays great stress upon this etiological factor. He particularly insists that metal workers and machinists are prone to develop disseminated sclerosis, and he believes that metallic poisons produce the disease. If his assumptions were correct, however, we should expect to find disseminated sclerosis much more frequently than we do among this class of workmen. We should also have to attribute almost a specific action to such metallic poisons, and we might be permitted to assume that it played a part in the development of all cases irrespective of occupation; 4 of our cases were machinists and brass-workers and 4 were jewelers working in brass, gold, and silver. On the other

hand 18 were women whose activities were confined solely to the home; 7 were school-children; 13 were clerks, stenographers, actors, etc., and the remainder had various occupations. It is reasonable to believe that occupation, like exposure, fever, and environmental factors, occasionally plays the part of activator of the disease which until then had lain dormant.

2. *Trauma.* Much the same may be said of trauma. Many observers insist that accidents and injuries are responsible for the disease. In only 4 of our cases could any such relationship be established. Recently the probable role that trauma plays in the development of the disease has become very important, because of the question of liability in accidents and their consequences. Pickenbach cites a case that illustrates this:

A man, aged forty years, on leaving his work tripped down stairs and struck his right arm, tearing or straining some muscles. Examination after four months' treatment revealed limitation of active and passive shoulder movements and atrophy of the shoulder-blade muscles. No other injuries or damages were mentioned at this time. For two months massage, passive motion, and electricity were employed, after which he was considered partially capable of performing work. Three years later he made claim against his industrial insurance company because of incapacity in working on account of pain in the shoulder. The testimony of a specialist accompanied the claim and showed the subjective as well as the objective signs of a chronic spinal disease, evidently disseminated sclerosis, that left the patient totally unfitted for work. The argument in the case naturally was whether or not the accident of two years previous was responsible for the development of the spinal disease. Pickenbach believed that there was no relationship between the two: (1) because the patient had not injured his skull or his spine, and (2) because two years had elapsed before the symptoms of the nervous disease showed themselves. He was not inclined to consider the shoulder muscle atrophies as due to anything else than the shoulder injury. Perhaps the suprascapular nerve had been torn at the time. He is unable to understand how an ascending peripheral neuritis could bring about a central nervous system disorder unless there were already present other conditions that would permit of the development of decided changes in the nerve cells.

He goes on record as saying that he agrees with Kienboeck, Kurt Mendel and Schuster, Vulpius and Ewald, who believe that the development of a spinal disease after trauma is very rare, and that heretofore too much importance has been placed upon trauma as an agent in exciting the latent disease into activity or in aggravating an already existing central nervous system disorder. Vulpius and Ewald further come to the conclusion that pathologic-anatomical processes of central nervous system diseases

cannot be influenced by a peripheral trauma. There is no ascending neuritis.

In some instances the trauma may have resulted because of the unsteadiness or insecurity due to an already existing disseminated sclerosis. There is no doubt, however, that trauma may introduce the disease. Frequently after the lapse of a few weeks or even a few days after the injury the suggestive signs and symptoms of disseminated sclerosis appear. Marburg suggests that there may have occurred a molecular or vascular damage in the central nervous system; that the delicate lymphatic walls have been lacerated, and that perhaps even minute hemorrhages have occurred. Nothing definite is known about this, however; attempts have been made to reproduce the condition by experimental trauma, but they have never been successful.

3. *Fatigue, Cold, and Exposure.* Exposure, wettings, and chills have been generally accepted as closely related to the development of disseminated sclerosis. Krafft-Ebing considers refrigeration one of the most significant factors in the etiology of the disease. Leyden and Goldschneider concur in this belief. Oppenheim, Cassirer, and Finkelburg believe that the nervous disease may be awakened by a chill or wetting. E. Müller attributes no close relationship between refrigeration or trauma and the disease, but he admits that it may play some role. Eichhorst states that "the actual significance of cold or wetting is not known, nevertheless there exists not a small number of cases of disseminated sclerosis in which this factor is the only one to be considered."

4. *Intoxications and Infectious Diseases.* Oppenheim is the champion of the view that metallic poisons play some part in the production of the disease. He found lead the commonest of these agents. Cases have been reported where zinc, mercury, copper, and other metals seem to be concerned in the production and development of the disorder. The intimacy of the relationship of such factors as these may be strikingly illustrated by the case reported by G. Etienne. Eight days after having been found unconscious from the inhalation of carbon monoxide the patient, a man, aged thirty years, developed paresthesias, and subsequently all the signs and symptoms of disseminated sclerosis.

The role of the infectious diseases in the production of disseminated sclerosis is well recognized. Typhoid fever, measles, scarlatina, diphtheria and pertussis have all been regarded as important etiological factors. The same is true for influenza, malaria, and rheumatism.

In none of our cases have we been able to detect an infectious disease as the causative or exciting agent. While many of our patients had experienced various infectious disorders in their infancy and childhood, in most cases years had elapsed before the first sign of the nervous disease appeared.

A well-known fact which we can corroborate is that syphilis appears to play no role whatever in the etiology of the disease. That hereditary syphilis is responsible for some cases, as Moncorvo suspects, we have never had the opportunity of observing.

5. *Physiological Causes* (Menstruation, Pregnancy, and Parturition). These events, always associated with more or less trauma, unquestionably have an important place in the etiology of disseminated sclerosis. Even puberty, with its lesser damages, has been considered responsible for the disease in a few cases.

We have not been able to fasten the responsibility for the production of the disease nor for its aggravation upon any of these factors, however. We cannot believe such events cause the disease, nor can we believe that they or the occupations, trauma, infections, and all other exogenous factors play a more important role than that of releasing a dormant or hitherto quiescent process. That some exogenous factor may be discovered eventually, proved specifically responsible for this peculiar pathological condition, is possible though problematical. At present we have not the slightest clue as to its nature.

Pathology and Pathogenesis. The sclerotic areas may be few or many in number, irregularly distributed throughout the entire central nervous system, the nerve roots and nerve trunks. Even in cases where the symptoms suggest the involvement of a limited or localized area of the brain or cord smaller and milder patches are discovered disseminated throughout the cerebrospinal structures. Erb has stated his belief that a strictly cerebral or spinal type of the disease is very uncommon.

The patches appear as irregular but sharply outlined islets of a translucent grayish-red color. This color, contour, and consistency depend upon the age of the patch. In recent cases they are translucent, gray or gray-brown, soft and gelatinous, while in older cases they are glistening and firm to the touch. They vary greatly in size, from minute affairs that can scarcely be discovered without magnifications to enormous ones in which the area may be several square inches.

The distribution of the lesions has been the subject for study by many observers during the past few years, and several important facts have been brought out. For example it had always been generally considered that the pathological process confined itself, as a rule, to the central nervous system proper, the structures in which glia was a constituent. Now, however, careful study of the changes in the peripheral nervous system reveals the fact that it, too,may be attacked. Practically all the cranial nerves have been found affected; changes have been observed in the spinal roots and even in the trunks of the nerves.

Recent investigations have endorsed the views of many older observers that certain sites are more frequently attacked by the

disease than others. Many years ago Charcot stated that the lesions were more numerous in the white matter; that they display a preference for the ventricle walls and for the intraspinal but not the extraspinal portions of the nerves. Erb found the centrum ovale, the walls of the lateral ventricles, in fact of the entire ventricular system, and the white columns of the cord the favorite seats of the disorder. Strümpell, Gowers, and Risien Russell have endorsed these views. The old belief of Charcot that the cerebral and cerebellar cortex were rarely attacked has been maintained to the present day. Gowers believes that the process never begins in the gray structures, though occasionally it invades these. Risien Russell calls attention to the fact that though the cortical gray is only infrequently the seat of the process the gray matter of the basal ganglia is a favorite locality for it.

These observations would seem to support the view we hold, with others, that the structures bathed by the cerebrospinal fluid are the ones attacked. Tredgold recently has stated that the patches "are most plentiful in that portion of the centrum ovale adjacent to the lateral ventricles; indeed, in many cases they are in contact with and seem to extend inward from the ventricular walls precisely as they do in the cord from the fissures." Shoyer from his interesting anatomical study of two cases of disseminated sclerosis arranges the sites of the process in the cord as follows: (1) about the posterior fissures; (2) about the anterior fissures; (3) about the central canal; (4) about the entry and exit of the roots; (5) about a point in the lateral margins of the cord. He assumes that these are produced by a poisonous agent conveyed by the cerebrospinal fluid.

The work of S. P. Kramer upon the circulation of the cerebrospinal fluid unconsciously supports this view. He has injected stain into various localities of the cerebrospinal system of the living dog, and has demonstrated "the long-known though often forgotten fact that the subarachnoid cavity does not extend over the cerebral hemispheres." When methylene blue is injected into the subdural space over the cerebral cortex it remains confined to that portion of the brain above the tentorium. When it is injected under the dura in the cerebellar region the entire surface of the cerebellum, pons, bulb, upper cord, the base of the brain, and the cranial nerve sheaths are stained. When, however, the injection is made into the subarachnoid cavity of the spine the following structures are stained: (1) the outer surface of the cord in the vicinity of the injection site; (2) the lower end of the spinal cord; (3) the structures about the central canal of the spinal cord, fourth ventricle, aqueduct, and lateral ventricles; (4) the cerebellum; and (5) the sheaths of the cranial nerves. Kramer's experiments seem to prove conclusively that the direction of the current of the spinal fluid in the subarachnoid is downward, then into the ventricular system,

entering the cerebrospinal canal somewhere near the termination of the cord, then ascending the canal to the fourth ventricle, and through the aqueduct to the lateral ventricles. Such a circulating medium appears to have nothing to do with the surface of the cerebral cortex. Furthermore, the spinal nerve roots outside the dura are not stained, so there is evidently no lymph connection between the spinal subarachnoid space and the nerve sheaths. Assuming, therefore, that the poisonous agent circulates in the spinal fluid it is reasonable to believe that only these structures washed by the fluid become the sites of the diseased process.

Microscopic study of the acute patches reveals characteristic changes in the sheaths and in the axis-cylinders themselves. The diseased patch is usually sharply defined or delimited from the surrounding healthy structures. The border, however, may be less involved than the centre. E. W. Taylor has described patches in which there was no such border or intermediate zone; there was abrupt transition from the diseased to the healthy tissue.

In the border there may be observed various degrees of disturbance to the sheaths and axis-cylinders. The sheaths may be swollen, irregular, and knobby, while phagocytic cells may be observed plentifully, carrying away the products of fatty degeneration to the perivascular lymph spaces. Such spaces are often crowded with lymphocytes, leukocytes, and plasma cells, suggesting a distinct inflammatory reaction.

The axis-cylinders evidently are more resistant than the sheaths to the action of the toxic agent. Patches have frequently been described in which the sheaths had disappeared entirely, leaving the axis-cylinders intact. For a number of years this was considered the peculiar hall-mark of the pathological process, and even today, when we know that these axis-cylinders eventually are destroyed, we regard this peculiar resistance as characteristic of disseminated sclerosis.

The changes occurring in the axis-cylinders have been carefully studied and prove to be similar in character to those observed in the sheaths. They become swollen and lose their capacity for staining clearly; they become thin and spiriform; they show fusiform thickening. Definite disintegrative changes occur in certain portions of the axis-cylinder while other portions of the same fiber remain normal. The fibrils may remain intact even though the axis-cylinders are intensely swollen, but they too finally succumb.

These phenomena accompanied by vascular changes are regarded by Gombault as a "periaxial neuritis." The acute patches produced in this manner and the subsequent changes, chiefly glial and vascular in character, are defined by Marburg as "encephalomyelitis periaxialis scleroticans." His views are in the main held by G. Oppenheim, Tredgold, Lejonne and Hermitte, Maasz, Risien Russell, and others. The actual sclerotic phase occurs probably

after the acute condition. With the removal of the degenerated products by the phagocytes, numerous spaces or interstices are left, giving the patch its "areolated" appearance as Redlich describes it. It is at this time that the glia proliferation attracts attention. Previous to this time no increase in fibrillar structure can be observed, though there may be proliferation of the glia cells. At times a scarcely visible webbing of young neuroglia can be discerned woven throughout the affected parts. Eventually there is a heavy glial growth and a thick fibrillar network is formed. Dense masses of interstitial tissue are found running parallel to the involved fibers in the patch. When the gray structures are affected a thick mesh composed of small glial cells and fibrils is seen branching in all directions from the denser and older centre. An ancient patch in which the glia has shrunk, and in which various changes in the vessel walls may have occurred, generally exhibits profound destruction to the axons and sheaths. It is only rarely the case that the axis-cylinders persist throughout this stage of glia proliferation, though this may actually occur.

Much discussion has arisen concerning the condition of the bloodvessels in the diseased patches. Many observers have found no significant changes, while others have described every degree of involvement of the vessel walls from simple nuclear increase and scarcely noticeable thickening to the densest thickening with hyaline degeneration and occlusion of the lumen.

What remains the most perplexing feature after all, however, is the absence of secondary degeneration in the involved tracts. Schultze has endeavored to explain this as due to the integrity of the axis-cylinders; that as long as they remained functional secondary degeneration would not occur. At present, however, we know that even with total focal destruction of the nerve fibers, sheath, and axis-cylinders there may be no secondary degeneration. Marinesco and Minea recently offered an interesting explanation concerning this phenomenon. They believe that systemic degeneration occurs, but that the degenerated fibers are absorbed and therefore are not to be observed. This idea is supported by the observations of others who have been able to note individual fibers in the columns, undoubtedly showing degenerative changes. Still others have recorded cases where the degeneration of entire tracts was pronounced.

The Character and Origin of the Pathological Process. We know no definite or adequate explanation of the nature of the process. The essential question of which structure is primarily involved has never been answered. If we possessed such information we should soon after, in all probability, discover the nature of the diseased process. The four well-known hypotheses concerning this problem are still with us and each has its supporters.

1. *The Parenchymal Theory* (Adamkiewicz, Huber, Redlich, Richien Russell, Borst, Thomas, and others). The neurons themselves are initially involved. Through the action of a toxic agent circulating in the blood or the cerebrospinal fluid there occurs focal destruction of the sheaths and axis-cylinders. Subsequently there is secondary proliferation of the glia, and eventually structural vascular changes may develop. New evidence has recently been offered (Siemerling and Raecke) which appears to support the idea that the process is a definite parenchymatous inflammation inaugurated by capillary hemorrhages.

2. *The Interstitial Theory* (Charcot, Leyden, Wernicke, Erb, Goldschneider, Gowers, and others). This is the oldest of the views, and it is summed up by Charcot's definition "a primary and multilocular chronic interstitial myelitis or encephalitis." The interstitial tissue is the initial seat of the pathological process; the changes in the parenchyma are secondary. Leyden and Goldschneider are of the opinion that the whole process is a type of chronic myelitis.

3. *The Multiple Gliosis Theory.* Strümpell regarded the disorder as a multiple gliosis, owing its existence to some congenital or inherited tendency to proliferation of this tissue. Here too the glia is the initial structure implicated, but the disorder is not inflammatory in character. Strümpell compares the disease to multiple neuroma, lipoma, and others in which congenital influences evidently play an important role. This hypothesis is the only one which assumes an endogenous cause for the disease. Such an inherited tendency may be alone sufficient, but exogenous influences may give the impetus to development of the process. E. Müller and Byron Bramwell support Strümpell's idea.

4. *The Vascular Theory* (Rindfleisch, P. Marie, Ribbert, Bastian Popoff, Buss, Hess, Williamson, and others). This theory attributes the disease to a primary disorder of the bloodvessels, with secondary changes in the parenchymal and interstitial tissues. Tredgold rejects it, saying that local areas of necrosis as a result of vascular disease have not the sharp, punched-out appearance of those in disseminated sclerosis. As a matter of fact, vascular changes are rarely prominent in this disease, while they are pronounced in definite vascular disease such as syphilitic endarteritis. In many cases of disseminated sclerosis no vascular changes whatsoever are to be found.

Notwithstanding the fact that knowledge concerning the origin of the disease is quite indefinite, we are ready to accept the view that it is essentially a parenchymatous degeneration produced by a toxic agent. Whether this be a degenerative process from the very beginning or whether it be preceded by an actual inflammation remains to be discovered.

Types of the Disease. On attempting to classify types of the disease we meet with considerable difficulty. Our classification must be either anatomical, physiological, or clinical, and none of these lends itself to definite division. That is to say, we can no longer speak of a cerebral, a cerebellar, or a spinal type unless we mean that the intense or the pronounced damage has evidently occurred in these localities, although we recognize evidences of lesser involvement elsewhere. It is exceptional that these localities are affected alone; the disease is now regarded as a general one in which the lesions are scattered throughout the cerebrospinal system. The same difficulty is encountered on attempting to group the cases from a physiological stand-point. Should we speak of a "spastic-paretic," or an "ataxic," or "hemiplegic" form of the disease we must bear in mind that only rarely do these disturbances occur, uncomplicated by symptoms of involvement elsewhere.

Nevertheless, both of these classifications, inaccurate as they must be, are not without value to us, for they reveal the widespread distribution of the process, on the one hand, and the great variety of symptoms on the other.

Depending upon the site and the intensity of the lesion, practically every symptom of involvement of the nervous system may occur. They may be so slight that their existence may remain unrecognized for months; the patient himself may be unaware of them or he may disregard them. Minor disturbances of muscular power, a tendency to fatigue too readily, a slight incoördination or loss of skill, may not excite his attention until they tend to incapacitate him. This is true, likewise, of the sensory disturbances, paresthesias, blurred and double vision, headache and dizziness, and many others, particularly when they are of temporary and short duration.

On the other hand the disorder may be introduced without the slightest warning by a complete and sudden apoplectiform hemiplegia, which may be accompanied by aphasia.

We have found in the large majority of our cases that the earliest manifestation was weariness and weakness in the legs. The patients describe this "leg weariness" as a feeling of heaviness in the feet and an abnormally early tiring and fatigue. Frequently there is associated a weakness of the bladder; there is inability to hold the urine as well as usual, and there may be urinary incontinence at times. Invariably when the patients presented themselves there was already established an involvement of the motor mechanism of the legs and bladder, which varied from a mild spasticity to a totally incapacitating spastic paralysis. It is quite extraordinary that we report eighty-three of our cases of this type, not one in which the arms were involved in a similar manner. And equally remarkable is the fact that we have never encountered a case in which the paralysis was of the lower neuron type.

The variability in the manner of development is as great as that of its intensity and impairment. For a long time, perhaps years, there may be no subjective manifestations. Not infrequently the patient tells of occasional cramps in the legs or a "drawing up" of the legs at night. There may be but slightly disordered gait, due to a characteristic stiffness which, in severer form, may be associated with weakness and unsteadiness. In other cases the gait may be profoundly impaired and in a short time locomotion may become impossible. Under such circumstances the rigidity may be extreme and the patient becomes unable to lift the feet from the floor because of flexor spasm. Eventually, unable to stand, he becomes the bed-ridden victim of flexor and adductor contractures.

The bladder and rectal sphincters seldom escape in disseminated sclerosis of this type. Here again all degrees of impairment are met with, although, as a rule, they are slight in the beginning and are due to hypertonicity. The earliest difficulty is the inability to retain the urine for any considerable time; it becomes imperative to release the bladder upon its earliest demands. Retention often occurs and the spastic contraction of the sphincter may be sufficient to prevent the entrance of a catheter into the bladder. In later stages and in fully developed cases of the lower spinal type of the disease incontinence is present practically always. Involvement of the rectal musculature occurs much less frequently.

Disorders of the cutaneous sensory mechanism were present in less than 10 per cent. of our cases. Most of these were subjective feelings of numbness and tingling in the extremities. Pain as a symptom was rarely encountered. It is an interesting fact, in accord with most writers, that the shooting pains and other crises so common in tabes practically never occur. Objective sensory disturbances were discovered very rarely, and even in those cases where paresthesias were pronounced it was the exception to find noticeable defects in the acuteness of the cutaneous sensibility. Cases occur, however, where there is marked sensory disorder in the hands and feet. Deeper sensibility was impaired in very few of the cases seen by us. Astereognosis was recorded in four of them.

We wish, therefore, to classify a group of cases of disseminated sclerosis which was by far the commonest in our series as the spastic type; characterized by hypertonic paresis or paralysis of the legs, usually accompanied by bladder weakness, and, infrequently, by disturbances of the cutaneous and deep sensibility. Quite often no other signs were present, but usually there were evidences of involvement of other parts of the nervous system. Nevertheless the characteristic impairment was the involvement of the legs and bladder. This permits of a convenient clinical grouping; 65 per cent. of our cases come under this division.

A second type of the disease may be considered as the ataxic.

Here the dominating feature is the incoördination or unsteadiness due to ataxia and tremor. Arbitrarily we may place in this group those cases in which the chief disorder is ataxia, vertigo, intention tremor, scanning speech, and nystagmus. These symptoms rarely occur singly. Usually they are all present in the same case, and quite often they are accompanied by manifestations of more or less severity due to involvement of the spinal cord. This is the cerebellar form of disseminated sclerosis; 25 per cent. of our cases were of this group, which approaches the classical type of the disease described by Charcot.

Ataxia is not infrequently the initial symptom of bulbar and cervical involvement. Such cases may simulate tabes dorsalis; the disordered gait and station may be identical with that of tabes because of involvement of the kinesthetic pathway. More commonly, however, the ataxia is of the cerebellar type, uninfluenced by vision; that is to say, it is not made worse by closure of the eyes.

Intention tremor is more frequently encountered. The nature of this characteristic symptom has given rise to considerable speculation, particularly concerning its relation to ataxia. At times the tremor becomes so pronounced that it results in marked incoordination. Strümpell considers it a genuine ataxia and Risien Russell believes it is due to "a failure of synergic action of muscles in purposive movements, consequent on an unequal degree of innervation both of the muscles directly concerned and of their antagonists." The tremor usually accompanies movement and is seen, therefore, more commonly in the eyes (nystagmus), head, and hands. It is well known, of course, that it becomes most pronounced on effort or fixation and in muscles that have been previously fatigued. The innervation of the trunk muscles is quite frequently affected and the station and gait may be profoundly disordered by this asynergia alone.

A great variety of speech defects have been described. These range from the slightly monotonous speech (bradyphasia) to disturbances which are truly ataxic. The characteristic disorder, however, is the slow, scanning, syllabic speech due to abnormal intervals between the words and even between the syllables. The cause of this is an unusually rapid fatigue of the speech and respiratory muscles and an inability to adjust perfectly the relation between the action of the expiratory muscles and those of the larynx. This rapidly developing weariness and fatigue is well illustrated in one of our cases:

Patient is M. B., a young girl, unable to speak any considerable sequence of words because of loss of power. She is also unable to hold her breath after a full inspiration for more than a few seconds. In attempting to sing any moderately high tone she can sound it, but it exhausts almost at once. These disorders, in addition to

a slight oscillatory nystagmus, were the only symptoms present; nevertheless, we feel justified in regarding them as evidence of a beginning disseminated sclerosis.

Very rarely the speech becomes almost entirely disorganized. It may be of a paralytic character, and when accompanied by disturbances in coördination of the swallowing, breathing, and heart mechanism may be considered due to a lesion in the bulb.

Nystagmus may be considered as fundamentally a fatigue phenomenon, due to an incapacity for even slightly sustained effort, because of abnormally quick fatigue (Uhthoff, Marie, Strümpell). Essentially also it is an intention tremor (Charcot), similar to those we have been describing. We shall discuss nystagmus more in detail in a subsequent part of this paper.

The third group is characterized by hemiplegia of evident cerebral origin, identical with that occurring as the result of the occlusion of a cerebral artery. This hemiplegic type occurs relatively infrequently. Developing gradually, as a rule, but at other times with apoplectic suddenness a paralysis of one side of the body occurs, varying in intensity from a slight weakness and loss of skill in performing fine movements to complete incapacity. Such a disorder due to disseminated sclerosis is usually described as of fleeting character. After a few weeks or even after a few days the function may be restored in large part or completely. Our cases (7 per cent. of the series) were not so fortunate. Months and years elapsed yet no improvement took place.

Again it becomes necessary to remark that the hemiplegia may exist alone. No other characteristic evidence of disseminated sclerosis need necessarily be present, especially if the disease is being introduced in this fashion. The paralysis may develop overnight in an individual otherwise apparently normal. The subsequent career of the case is necessary, as a rule, before a definite diagnosis may be permitted. More usually the hemiplegia arises in cases that had been recognized previously as disseminated sclerosis, or which upon subsequent examination show significant signs of involvement of other parts of the nervous system. An instructive illustration of the hemiplegic form of the disease is the following case:

A strong, well-developed girl, aged nineteen years, a champion swimmer, noticed a progressing awkwardness in her hands, which had been preceded for two months by a painful coldness in the hands. She dropped articles from her hands when her visual attention was not directed upon holding them.

Her previous history was negative except for two accidents from which she apparently fully recovered. When sixteen years old she struck her head while diving and immediately felt a "pins-and-needles" sensation down her spine, but no apparent damage was done. During her seventeenth year she was knocked senseless

in a basket-ball game and felt too ill to attend school the following day, but was soon as well as ever.

Soon after the disability in her hands, weakness of the left leg developed so that it dragged in walking. She suffered also from an acute coldness in all the extremities. At the same time it was observed that she did not fully appreciate pin-pricks in the hands and arms. Three months later she became irritable, emotional, and unable to walk or stand. After seven weeks in bed she improved so much that she was able to take long walks; the left arm and hand, however, had become increasingly disabled, so that they were now stiff. After being urged she went into the ocean to swim, the idea being to increase the function of the rigid arm and hand. The result was disastrous, as there developed a rigidity of the left leg and loss of bladder control, as well as ataxia in the right arm. In short, within a period of six months a vigorous athletic girl had developed a hemiplegia which has persisted to the present time, a period of three years. Her mentality is good but she is emotionally unstable. In speaking, words flow faster and faster, so that at the end of a statement there is an explosion of sound accompanied by exaggerated movements of the face and irregular movements of the right arm. The spinal fluid is normal.

As a matter of convenience we shall now consider the signs and symptoms of involvement of other parts of the cerebrum and the cranial nerves. This includes psychic disorders as well as disturbances of the optic and auditory pathways. Disseminated sclerosis may exist without any of these, particularly when the pathological process is confined largely to the spine and bulb. As a rule they are present, more or less prominently, in all cases where the cerebrum and cerebellum chiefly are affected, and this is particularly true of involvement of the optic tract.

Ocular Phenomena. The recognition of the changes occurring in the visual apparatus is of the utmost importance in the matter of diagnosis. It not infrequently happens that they may be the only manifestations of the disease for months and even years before other characteristic signs appear elsewhere. Windmüller, for example, records a case in which acute retrobulbar neuritis occurred seven years before any other symptoms could be distinguished. Moreover the ocular changes are among the commonest of the diseases, as Uhthoff has disclosed, and they may be considered almost characteristic or at least strongly corroborative of disseminated sclerosis alone. The most typical are the changes that occur in the acuity of vision, the disorders of the visual fields, and the alterations in the appearance of the disks.

Visual Acuity. A slight blurring of vision with occasional flashes of light before the eyes may be the earliest manifestation of the disease. As a rule this is only a transient process which may not reappear for weeks or months. It usually remains confined to

one eye, and it may or it may not be accompanied by changes in the disks. This tendency to improvement and relapse has long been regarded as peculiarly characteristic of disseminated sclerosis. There may be defective vision for months, limited, perhaps, to one eye, followed by a period lasting for months, during which there is apparently normal vision, then eventually the return of the disorder to the same eye, the other eye, or both of them.

The onset may be gradual and scarcely appreciated by the patient. More frequently it announces itself suddenly in almost complete blindness. Even in such cases remissions occur lasting variable lengths of time. This peculiar quality of the symptoms need not necessarily be present in every case, however; 21 per cent. of our cases had ocular symptoms, but in not one of them could a history of remission be obtained.

Visual Fields. The essential cause of the amblyopia and the disorders of the visual fields is considered to be a sclerotic patch in the optic nerve, commissure, or tract. This is contrary to the older view of Gowers, who regarded the optic atrophy as the result of a primary degeneration of the nerve elements similar to that which occurs in tabes. The more recent evidence supports the idea that the pathological process is a retrobulbar neuritis which results in more or less destruction of the nerve elements. We should expect early manifestations of involvement of the macular fibers, therefore, and this actually occurs. Central scotoma is a prominent and common disturbance in disseminated sclerosis. Uhthoff observed it in 15 of his 20 cases; Klingman, recently, in 11 of 14 cases.

The occurrence of retrobulbar neuritis in any case, but especially in the young, should at once excite suspicions of disseminated sclerosis. It is an acute process, as a rule, giving rise to damaged vision and central scotoma which show a tendency to improvement. Nicotin, alcohol, and syphilis have commonly been blamed heretofore, but in many cases it has been impossible to establish any relationship between the disorder and these agents. Such cases of so-called "idiopathic retrobulbar neuritis" have recently been studied by Fleischer, who regards them as early manifestations of disseminated sclerosis. Schultze, furthermore, examined cases in which tobacco, alcohol, and syphilis had been considered the causes and found unmistakable evidences of disseminated sclerosis in many of them.

Peripheral contraction of the visual fields, while not so common as central scotoma, occurs quite frequently. Uhthoff observed it in 11 of his 24 cases; Klingman in 11 of 14 cases.

Changes in the Disks. The characteristic change noted in the disks when the optic nerve has been implicated is atrophy. Any stage of the process may be encountered from a slight pallor of part of the disk to complete atrophy in both eyes. The entire

disk may not be equally involved. Various portions appear degenerated before others; even in the earliest stages it is well known that the temporal half is earlier affected than the nasal half. There may be a great difference in the extent of involvement of the two disks; a beginning pallor alone may exist in one eye while extensive atrophy is present in the other.

The most remarkable fact, however, concerning the changes in the disks is the discrepancy which exists between the apparent degree of atrophy and the actual disturbance of vision. Pronounced pallor of the disk may be present for months and years with practically no diminution of visual acuity. On the other hand, marked involvement of the fields and visual disorders may exist when the disks appear quite normal. This peculiar lack of parallelism between the structural damage and the functional incapacity is unique with disseminated sclerosis among all the organic nervous diseases. Not only is this true on the part of the ocular apparatus, but the entire brain and cord may be the seat of extensive tissue changes disclosed by autopsy in cases whose clinical career had been extraordinarily mild.

Affections of Ocular Motility. Nystagmus when present is one of the most characteristic symptoms of disseminated sclerosis. It is one of the original triad of symptoms of the classical types of the disease described by Charcot, and even now when we no longer demand its presence to distinguish the nature of the disorder we recognize it in nearly 60 per cent. of all cases.

As a rule true nystagmus appears late in the course of the disease, though "nystagmiform" jerkings and twitchings may have existed before. Uhthoff, Baranyi, and Bartels would have us distinguish between the two. True nystagmus, which is oscillatory, swinging to and fro about a central point with rapid equal movements, is in all probability a fatigue phenomenon (Uhthoff, Marie, and Strümpell). It occurs independently of voluntary movement of the eyes, in changing the direction of gaze; the oscillations continue even in the resting stage. It becomes more intense, however, when the eyes are turned and attempts at fixation are made, particularly in extreme directions. At such time the "nystagmoid" movements appear. They are characterized by sharp, quick jerks in the direction of the object of fixation, with slower movements of return. These movements occur about three or four times a second and appear to be in every respect "intention tremors" (Charcot).

Uhthoff found external ophthalmoplegia well established in 17 per cent. of his cases. The sixth nerve was more frequently involved than the third or fourth. The disorder is not usually so severe, however; transient weaknesses of individual muscles are more likely to be met with, and these are scarcely ever maximal. Windmüller records ocular palsies, counting diplopia as an evidence of such in 70 per cent. of his cases.

Pupillary changes are uncommon. The reflexes are generally active, and only at times may a slight disparagement be observed between the activities of the two sides.

Auditory and Vestibular Systems. The cochlearis division of the auditory nerve is only rarely involved. The symptoms may vary from a slight acoustic hyperesthesia (E. Müller) to total deafness. O. Beck describes two cases in which he was able to diagnose disseminated sclerosis without any neurological data except the peculiar variations of the acoustic and labyrinthine functions. Excitability of the vestibular apparatus and capacity for acute hearing, determined by many tests, alternated with absence of excitability and complete deafness without revealing in the interval any of the typical signs of labyrinthine impairment. This variance between the subjective symptoms and the objective signs is similar to the condition frequently observed on the part of the visual apparatus; the coexistence of quite normal vision with marked pallor of the disk, and *vice versa*.

Unusual rapid fatigue of the acoustic mechanism determined by tuning-forks was discovered by Claude and Egger, and daily changes in acoustic keenness have been observed by Marburg.

Involvement of the vestibularis division of the auditory nerve is not uncommon. Vertigo is frequently an initial symptom of the disease. Nystagmus and its significance has been discussed previously.

Psychic Phenomena. Psychic disturbances of every variety have been observed from slight blunting of mental activity to profound dementia. They may precede the development of the more usual symptoms of disseminated sclerosis by months or years, their true nature, therefore, remaining unrecognized. It is very difficult to say how frequently mental symptoms occur as early evidence of the disease, for they may be of such slight significance as to escape notice, or so severe as to necessitate the confinement of the patient in psychiatric hospitals where it is not unlikely their true nature could only have been determined by the subsequent appearance of other characteristic evidence.

Changes in the character and disposition may occur; an unusual cheerfulness, an uncustomary tendency to laughter entirely out of proportion to the exciting cause. A distinct euphoria is common, accompanied by more or less boisterous laughter. Ten of our cases presenting mental symptoms behaved in this fashion, and they revealed, in addition, impairment of memory, judgment, observation, and attention. As a rule there was always to be observed a heightened sensitiveness or increased excitability, though in none of them did this ever become a delirium or mania.

In three cases pronounced apathy and depression were early symptoms.

Course and Development. Disseminated sclerosis reveals itself gradually, as a rule, developing so insidiously that it

frequently escapes observation for months. We must not lose sight of the fact, however, that it may be inaugurated abruptly, with apoplectic manifestations, although, as we have pointed out, this manner of onset is very unusual.

Once established the disease runs a chronic progressive course, during which there may be remissions and even apparently complete recovery. Most observers lay stress upon this. It has become an accepted fact that remissions are characteristic of the disease. We have no intention of disputing this; nevertheless, in our cases it has not been observed except in a few instances when slight improvement occurred. With these exceptions they were all of the chronic, progressive type of long duration. The duration of the disease is very indefinite. It is apparent, of course, that years may elapse before death, which is usually due to complications or intercurrent diseases.

Diagnosis. The recognition of the fully established Charcot case presents no very great difficulties as a rule. With all the cardinal features, or even a few of them, there is little possibility of error. Tremor, nystagmus, and incoördination defects, especially in the young, may be considered due to disseminated sclerosis, keeping in mind, however, the important reservation of cerebellar tumor or cyst. It is vitally important that we do not overlook these because of the relief now possible by early surgical intervention.

Cerebellar Tumor and Cyst. The difficulty in the differential diagnosis is dependent upon the fact that a small cerebellar cyst or a slowly expanding tumor before being able to raise the intracranial tension behaves exactly as a sclerotic patch. The difficulties may be illustrated by this case:

J. H., aged nineteen years. In June, 1912, his gait became unsteady; people believed him to be intoxicated. Two months later he began to vomit after his meals and soon began having headaches all day long. Two months later the headache and vomiting diminished in intensity, but he then became disturbed by vertigo. On examination he presented static and dynamic ataxia, tremor, slurred speech, and nystagmus. The disks seen in the early phases of the process showed clear and there was no fault in the vision. In the course of the following year the signs of increased intracranial tension revealed themselves. A definite choked disk appeared and an operation was decided upon. Cystic tumor of the right cerebellar lobe was found. The patient recovered promptly and at the time of this record has been relieved of most of his disorders.

Only one fact is of value in influencing our diagnosis and determining our course in this case: that is the presence of symptoms that must always be regarded as significant of increased intracranial tension. Headache, vomiting, and giddiness, with optic

neuritis, are not at all uncommon in disseminated sclerosis; nevertheless these must remain the exceptions, and in case of doubt, as we encountered in the case above, with such symptoms present, we dare not disregard the idea of tumor until we have disproved its existence.

The absence of spasticity is of no value one way or the other. It is true that in disseminated sclerosis we encounter spastic phenomena commonly because of involvement of spinal tracts by other sclerotic patches, and in cerebellar tumor this does not occur until by expansion pressure is exerted upon the pyramidal system.

Because of the symptoms of increased intracranial pressure we diagnosed tumor which proved to be correct.

Cerebrospinal Syphilis. Of first importance in the differential diagnosis of the less well-established and aberrant forms, particularly of the spinal or spastic-paretic type, is syphilitic pachymeningitis. The occurrence of spastic phenomena in the legs, with or without sensory and bladder disorders, is due, in the vast majority of cases, to syphilis; we have come to look upon these symptoms as more or less distinctive of this disease, and especially when a history of the infection is acknowledged. The difficulty in the differentiation is not so great in advanced cases; there is usually some corroborative evidence present, as involvement of the pupils, the cranial nerves, or, perhaps, apoplectiform attacks. Without these, especially in the early phase of the disease and without additional proof of disseminated sclerosis, we have no means of deciding unless we resort to examination of the cerebrospinal fluid.

We are in possession of valuable facts concerning the spinal fluid in nervous diseases through the important studies and contributions of Nonne, Plaut, Noguchi, Kaplan, and many others. The information obtained from serological and chemical examination of the fluid is invaluable in practically every disease of the nervous system we are called upon to treat; spinal puncture is a routine necessity in all neurological practice even when we feel secure with our clinical diagnoses.

Two laws seem already to have been established: (1) a positive Wassermann reaction in the spinal fluid, irrespective of the reaction in the blood, is absolutely certain proof of cerebrospinal syphilis; (2) in disseminated sclerosis the fluid is normal in every particular, that is to say, the Wassermann is negative, and there is no increase in the globulin or the lymphocytes.

The value of this information is at once apparent. If we recall that invariably with a cerebrospinal showing a positive Wassermann reaction we find the globulin and the cells increased, at times only slightly and at others enormously, we realize that we have a means of distinguishing between the luetic and the non-luetic spinal diseases.

Kaplan in the analysis of more than 3000 spinal fluids obtained

from patients having nervous diseases found 16 in which the diagnosis of disseminated sclerosis had been made with certainty, all of which possessed fluids normal in every particular. In cases where the differentiation was doubtful the laboratory analyses were considered sufficiently strong evidence to decide the question. When the fluid contained fifty or more cells to the cubic millimeter or an excess of globulin or a positive Wassermann reaction the diagnosis of disseminated sclerosis was excluded.

Whereas it is very common to find with a negative Wassermann in the fluid an increase of lymphocytes with or without an increase of globulin the reverse practically never occurs; that is to say, a positive Wassermann does not exist where there is neither lymphocytosis nor globulin increase. In but 6 of his 3000 analyses did he meet with this phenomenon, and all of these were cases of arterial syphilis.

Transverse Myelitis. In transverse lesions of the cord produced by localized myelitis, tumor, gumma or caries, or syringomyelia the differential diagnosis may require very careful deliberation. Myelitis develops quickly, as a rule, accompanied by fever and toxemia. Its sequelæ, spastic weakness, or paralysis of the legs and visceral and sensory disorders may be very severe and permanent, but is not progressive. Atrophy and fibrillary twitchings, frequent in transverse myelitis, are seldom encountered in disseminated sclerosis. Usually there are no cerebral symptoms in transverse myelitis.

Disorders of vision may be present, though they are unusual, and as recently pointed out by Ward Holden, lateral hemianopia for one eye alone is a symptom of considerable diagnostic value in cases in which visual disturbances precede the spinal symptoms.

Oppenheim and Cassirer have recently reported cases in which there developed quickly an acute ataxia with weakness of the upper extremities, atrophy of the intrinsic hand muscles, paresthesias, and objective sensory disturbances. They regarded the cases as acute cervical myelitis until subsequent developments proved them to be disseminated sclerosis.

Spinal Tumor. Disseminated sclerosis not infrequently gives rise to a series of symptoms suggesting spinal cord tumor. Nonne recently called attention to the difficulty which may arise in differentiating between them. Laminectomy performed in four cases of suspected tumor proved negative. Subsequently in two of these section showed disseminated sclerosis and disseminated confluent myelitis; and further progress of the other two substantiated the diagnosis of disseminated sclerosis. One of these was a youth, aged nineteen years, with symptoms of a transverse lesion of the dorsal spine. There were spastic paralysis of the legs and sensory disturbances to the ribs, with fever and slight delirium in the beginning of the disease. A laminectomy was performed, but no lesion was

discovered. In a few months decided improvement took place, and for five years the patient has been well. The history of this case is astonishingly like that of another which we had the privilege of observing on the service of Dr. Pearce Bailey. In a few months after laminectomy for suspected cord tumor had been done the patient, a splendidly developed athlete, with a profound paraplegia and bladder and sensory impairment, recovered completely; no trace of the disorder remained except an exaggeration of the knee and ankle-jerks.

Syringomyelia. Under certain circumstances, syringomyelia may resemble disseminated sclerosis, particularly as the rather characteristic dissociation of the cutaneous sensibility may occur in the latter. It has been stated also (Russell) that nystagmus may occur in syringomyelia.

In the early months of the following case the question of the existence of syringomyelia was given respectful consideration. Only with the unfolding of characteristic evidences of disseminated sclerosis was the correct diagnosis possible.

W. N., aged twenty-seven years, a draughtsman. His history is negligible. His habits excellent. He seeks relief for weakness in the right arm, numbness of the entire left side, and some slight difficulty in starting the urinary flow. These symptoms developed rather suddenly two weeks before his admission here.

Status July, 1910. Weakness of the right arm and to a lesser extent the right leg. All tendon jerks on the right are increased; ankle and wrist clonus present. Babinski reflex in right foot. All cutaneous reflexes absent on the right. Almost complete loss of cutaneous sensibility in the left half of the body from the clavicle to the toes. Wassermann negative in the blood-serum and in the spinal fluid. Patient made almost complete recovery in ten days.

Status August 22, 1910. New attack with sudden onset involving the right arm, the right leg, and the left leg. These extremities are now spastic while on both sides of the body there is complete loss of sensibility. Improvement began almost immediately. In one month the left leg was practically well; the right side improved more slowly.

Status October, 1910. Patient, who had been in good condition, suddenly became quadriplegic and lost all sensation to the level of the shoulders. Improvement began again, more slowly than before. In January, 1911, the left arm and hand were almost normal. He was also able to use the right hand quite well. Both legs still profoundly involved by a high-grade spasticity. Right and left-sided Babinski sign is present.

Status May 5, 1911. Halting, scanning speech is present now. There is also fine nystagmus apparent. Patient is depressed and irritable.

Paresis (general paralysis of the insane). There should be no longer any difficulty in differentiating between disseminated sclerosis and paresis, which it occasionally resembles. The stumbling and trembling speech of paresis with its omitted syllables and words differs fundamentally from that of disseminated sclerosis, while the mental changes of the latter are usually not so severe as of the former. In fact the objective evidences of paresis, including at the present time the characteristic cytological and chemical findings of the cerebrospinal fluid, are conclusive proofs of the disease.

Hysteria. We believe we have not encountered the difficulty, said to exist, in distinguishing between disseminated sclerosis and hysteria. The majority of authors, however, lay considerable stress upon the similarity between them. They are practically of one voice, furthermore, in saying that the difficulty generally results in mistaking an existing disseminated sclerosis for hysteria.

The two disorders are common to youth and young adult life, and both frequently develop after a physical or psychical trauma. A widespread variability of disorders is common to both of them, involving somatic, visceral, and mental functions.

The regular, concentric narrowing of the visual fields, especially with parallel contraction of the color fields, speaks for hysteria. Optic pallor and optic atrophy of hysterical nature is impossible. True nystagmus should always be considered evidence in favor of the organic disease. Sensory changes are common to both disorders, and are, of themselves, of not much importance in the differentiation. Sharply defined anesthesias and analgesias are not usually found in disseminated sclerosis and an anesthetic cornea practically never occurs. Bladder disorders are usually indicative of disseminated sclerosis, and actual exaggeration of the reflexes, especially when accompanied by a Babinski sign, must always be regarded as proof of organic nervous disease.

A sign of great importance in the diagnosis of disseminated sclerosis is the absence of the abdominal and epigastric reflexes. This was first pointed out by Strümpell, who observed it in 67 per cent. of his undoubted cases. His views have been corroborated by many observers. E. Müller and Cassirer, for example, regard the bilateral absence of these reflexes as of distinct and useful diagnostic significance. Marburg noted its absence in 38 of his 40 cases, and interprets it as an involvement of the lower third of the dorsal cord.

TREATMENT. No advance has been made in the treatment of the disease if we except radiotherapy as used by Prof. Marinesco, of Bucharest. He ventured to try this therapy because of the good effects he had observed in the use of the Rœntgen rays in disseminated sclerosis and syringomyelia. He described unquestionable improvement in the tremors, the weakness, and the fatiguability. Rays of 1 milliampère intensity were applied for seven to ten

minutes to the lumbar spine. No skin irritation or other complication ensued. We scarcely dare place any great hope in the agent, however, when we recall the nature of the pathological process. We must remember, too, that the improvements we may attribute to the action of the remedy may occur spontaneously.

In the meantime it is well to bear in mind the good advice of Oppenheim and Müller, that rest is essential; all fatigue is to be avoided, and only moderate exercise to be permitted. Gentle massage and sedative baths may be appreciated.

RESUMÉ. Disseminated sclerosis is encountered much less frequently in this country than abroad. This is due, in part only, to the fact that early and irregular cases frequently escape recognition here.

The fully developed, classical Charcot type of the disease is rarely seen.

Trauma, including occupation, injury, intoxications, biological crises, mental shocks, etc., play only a contributing role in the development of the disorder.

The disease is regarded by us to be a parenchymatous degeneration due to the action of a toxin circulating in the cerebrospinal fluid.

There can be no rigid grouping of "types" of the disease. Nevertheless three general groups can be assumed: a spastic-paretic, an ataxic, and a hemiplegic group.

The best single aid in the differential diagnosis is the condition of the cerebrospinal fluid. The Wassermann reaction is practically always negative. The number of lymphocytes is less than fifteen, and there is no excess of globulin. This is of special value in ruling out cerebrospinal syphilis.

The remissions which sometimes occur are singularly characteristic of this disease. In our series, however, they were rarely encountered.

The absence of the abdominal reflexes, upper and lower, is an important diagnostic sign.

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A CASE OF SPRENGEL'S DEFORMITY.[1]

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This article was written to put on record a case in which a complete autopsy was obtainable. For discussion of the etiology, symptomatology, etc., of the condition the reader is referred to Horwitz's article, mentioned below.

Definition. Congenital elevation of the scapula is an affection characterized by an upward displacement of one or both scapulæ, with rotation upon the sagittal or frontal axis. Alterations in shape, size, and density of the bone exist.

Historical. This condition, both on account of its rarity and because of its puzzling etiology, has been a source of interest for fifty years, the first case recorded being that of Eulenberg's in 1863. In 1891 Sprengel described four cases and advanced a plausible theory to explain the disease; since then the condition has been called "Sprengel's deformity" or "congenital elevation of the scapula." In view of the fact that the high position is not due to elevation but to failure of descent, possibly better terms would be "undescended scapula," "congenital high position," or "scapula alta congenitalis." An analogous instance in terminology is the undescended testicle, which we do not speak of as "congenitally elevated."

Frequency. Up to 1904, 100 cases had been reported. In 1899 Honsell reported the first case of bilateral disease, and up to 1908 14 such cases had been described in the literature. Horwitz,[2] in 1908, reported 16 cases himself and collected 120 from the literature, bringing the total up to 136. Less than 20 have been characterized by the presence of an associated bony arch, as found in the case we are reporting.

Physical Examination. The condition was found by us to exist in a body in the anatomical laboratory of the University of Pennsylvania. The subject was a male negro, about forty years of age, of medium size and good muscular and general development. A notable exception to this general statement was found in the right

[1] Read before the Section on General Medicine of the College of Physicians of Philadelphia, March 23, 1914.

[2] Amer. Jour. Orthop. Surg., 1908–09, vi, 260.

arm, which was about 3 cm. less in circumference than the left at both the arm and the forearm. In addition to being less developed it could be raised but slightly above the horizontal, this restriction being due to a limitation in movement of the scapula. Surface examination showed that the right scapula was about 6 cm. higher than the left, and between its vertebral border and the spines of the vertebræ a bony lump could be felt.

Bony Anatomy. The scapula differed from most of the cases hitherto reported in that, with the exception of the scapular index, it was approximately normal in size and showed pronounced roughenings for the attachment of strong muscles. On the vertebral border just below the spine was a triangular facet (Fig. 2), which faced forward and inward and articulated with a bony projection

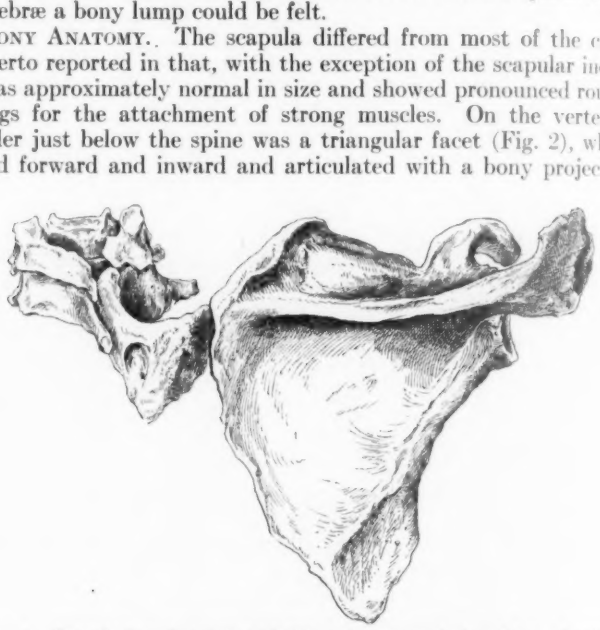

Fig. 1.—Dorsal view of scapula and fifth and sixth cervical vertebræ, showing articulation, exostosis, and spina bifida.

from the sixth cervical vertebra. As is common in Sprengel's disease, the bone had a scroll-like forward curve superiorly (Fig. 3), causing the upper border to project forward as a knife-like edge. The spine made less than a right angle with the vertebræ below it, so that it pointed out and down from the midline of the body instead of out and up, as is usually the case; this latter condition is found normally in the fetus.

The Vertebræ. The scapula articulated with an exostosis from the sixth cervical vertebra, this growth causing the lump felt on external examination, and the articulation being partly responsible for the restricted upward movement of the arm.

This osseous growth consisted of a strong, markedly curved process of bone (Fig. 1, 2, 3), about 4 cm. in length, which arose from the right lamina of the sixth cervical vertebra. Viewed from the

left it was seen to be roughly triangular, the apex being attached to the lamina and the base being free and directed well toward the right. Both the pedicle and lamina of the right side of this vertebra were much thickened. The growth measured about 2 cm. at the apex and about 5 cm. at the base. Its left side was separated from the vertebral spine by a narrow fissure (Figs. 1, 3), which extended clear to the spinal canal, the latter thus being open posteriorly, while the right side presented a deeply concave groove (Figs, 2, 3), for the accommodation of the semispinalis and rotatores and multifidus spinæ muscles. The upper half of the base had a distinct articular surface, which formed a true joint with the facet upon the mesial border of the scapula. This articulation was of the partially movable type, and was furnished with a capsule, the opening of which allowed the escape of fluid.

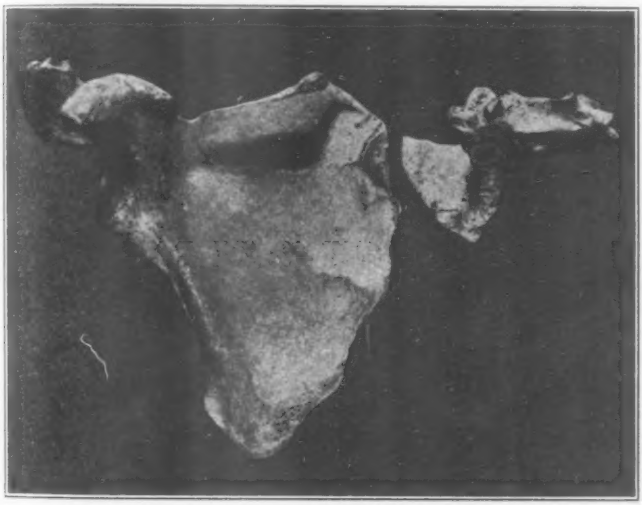

FIG. 2.—Ventral view of scapula and sixth cervical vertebra, showing the articular facet on the former and the exostosis on the latter.

A noteworthy point in regard to the vertebræ was that the right laminæ of the fifth and seventh, as well as the sixth, cervical vertebræ had not joined those of the left side to complete the arch; a condition of spina bifida (Fig. 1) was present in these three bones. The right lamina of particularly the fifth cervical vertebra was poorly developed, there being a gap (Fig. 1) of ¾ cm. posteriorly, which in the articulated state was filled in to some extent by that greatly hypertrophied right lamina of the sixth, from which sprang the osseous growth already described.

Muscular Anatomy. These anomalies of the skeleton were associated with striking deviation from the normal in the adjacent musculature (Fig. 4), the muscles involved being the trapezius, the levator anguli scapulæ, the rhomboideus major and minor, as well as several anomalous slips.

The trapezius: This muscle was represented by two portions, an upper and a lower, the former being large and very muscular and the latter small, atrophic, and composed mainly of fibrous tissue (Fig. 1). The former was so well developed that it gave the man a square, bull-necked appearance on the right side.

The upper part had the usual origin from the occiput and the cervical spine, while the lower arose from the upper thoracic vertebræ. At the first thoracic vertebra the upper muscular portion

Fig. 3.—View from above of scapula and sixth cervical vertebra.

ended abruptly, and at the point where it crossed the superior angle of the scapula it became densely aponeurotic; here it overlay a bursa. The insertion was normal, with the exceptions that it extended farther medially on the clavicle than usual, and that the insertion into the acromion was thicker and broader than normal, as well as unusually aponeurotic.

The inferior and smaller slip lay below the level of the spine of the scapula. It arose aponeurotically from the vertebral border of the scapula, the vertebral spines and the aponeurosis lying between by means of tendinous fibers, which were interwoven with superficial fibers representing the rhomboids. Under the aponeurotic origin a muscular origin appeared, the fibers intermingling with fibers of the rhomboids, and having a common origin with them from the seventh cervical and first thoracic vertebræ. It inserted into both

lips of the spine of the scapula to within one inch of the acromial tip, thus encroaching upon the origin of the deltoid, and causing that muscle to attach to the spine below the lower lip.

Subtrapezial plexus: Both portions of the trapezius obtained their nerve-supply from the subtrapezial plexus. A notable anomaly of this plexus was that it was composed only of the third and fourth cervical nerves; the spinal accessory failed to pierce the sternocleidomastoid muscle, its fibers terminating within that structure. This condition, while occurring independently of Sprengel's deformity, has been noted by other dissectors of this condition, and may have more significance than has been accredited to it.

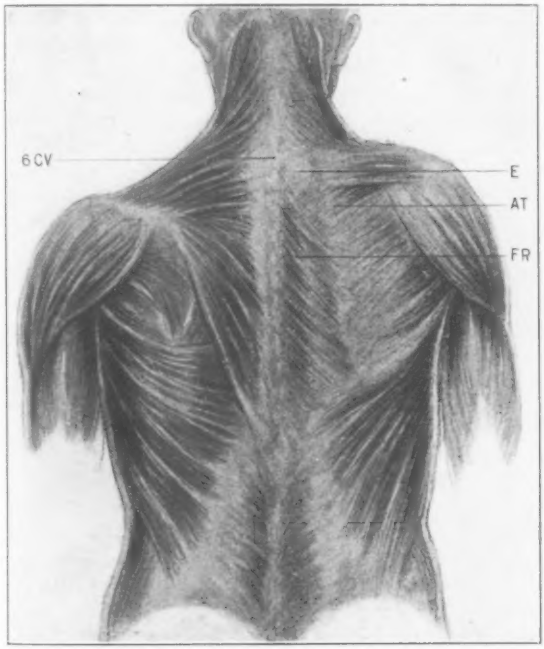

FIG. 4.—Superficial dissection. Shows high position of right shoulder. *6CV*, sixth cervical spinous process; *E*, exostosis; *AT*, anomalous portion of trapezius; *FR*, fibrous tissue replacing thromboid muscles.

The levator anguli scapulæ: This muscle was slightly below normal in size and branched toward its insertion in the form of a Y. One arm of the Y inserted into the superior angle of the scapula and the other into the bony arch. Not over 4 cm. separated the two insertions. If the two arms were spread so as to convert the Y into a T the cross-bar to the T would measure about 5 cm.

The rhomboidei major and minor: These muscles as such were absent, their place being occupied by white connective tissue whose fibers took the same general direction as those of the missing muscles would have done.

The serratus magnus: This muscle was continued upward and inward beyond the vertebral border of the scapula, and interlaced with the rhomboid fibers, making a strong network in which two layers of rather stringy muscle fibers lay.

Upon cutting the scapula away from the trunk two slips from the serrarus magnus were encountered, superior to the main muscle and its attachment to the vertebral border of the scapula. One of these inserted into the superior angle of the scapula, and had its origin from the scalenus anticus, medius, and posticus muscles. The other arose from the first rib and the scalenus posticus and inserted into the vertebral border of the scapula.

Anomalous muscles: Immediately posterior to the levator anguli scapulæ was a small slip of muscle which had its origin from the cervical aponeurosis opposite to the fourth cervical vertebra. Its insertion was very close indeed to that of the levator anguli scapulæ and the fibers ran in the same direction, but the two were not continuous. It was supplied by a twig from the fifth cervical nerve, which sent branches into the levator also, so that a fair conclusion would seem to be that it was an accessory levator anguli scapulæ, having its origin from the cervical aponeurosis.

From this description it will be seen that the elevated right scapula could have been movable only to a very slight extent. Most of the muscular attachments would tend to pull the bone upward or at least help to retain it in its high position, and a glance at the scapula or the bony arch will show that there was great muscular strain on these parts.

SOME REMARKS ON THE TREATMENT OF AMEBIC DYSENTERY.

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Within the last two or three years the scientific view-point concerning amebic dysentery and its treatment has undergone a decided change. While there may be present concomitant pathological conditions requiring appropriate attention, it is recognized that the crux of the whole therapeutic problem in this form of dysentery is to destroy the amebæ, and later to heal the ulcerated intestines and cure other complications.

For the destruction of the amebæ the treatment has practically narrowed down to two methods of medication: (1) internal and (2) hypodermic, and in the practice of the writer one method of intestinal irrigation, which is apparently a most useful adjunct. Granted this, the physician may be spared trying the numerous remedies which are recommended, many of which are utterly without merit. These three methods are the internal administration of ipecac, the hypodermic administration of emetin hydrochloride, and the injection into the large intestine of kerosene oil.

Internal Administration of Ipecac. For many years ipecac has been held in high esteem in East India and the neighboring Oriental countries, and while in some quarters it is unfavorably regarded it has the endorsement of Manson in England, Siler in this country, and others of authority. We have employed it in seven cases, with quite satisfactory results.

In giving large doses of ipecac, several details must be strictly observed or the stomach will not retain it, and consequent failure will ensue.

First of all the drug should be administered only in pill form, and these pills should be coated about a sixteenth or an eighth of an inch with phenyl salicylate (salol), for this coating does not readily dissolve in the stomach before it is absorbed and the violent emetic effect is avoided. The pills should generally contain 5 grains each of the ipecac.

If desired, castor oil may be given ten to twelve hours before the ipecac is to be taken, and a convenient method is as follows: No food is allowed for six hours and no water for three hours. Twenty drops of tincture of opium should be administered thirty minutes before the ipecac pills. The patient should be kept on the back and the pills swallowed with as little fluid as possible. After taking them he should not be allowed to move or speak or expectorate, and the nurse should keep a cold cloth over his throat and frequently bathe his face with cold water. The head should be kept low and both physical and psychic quiet enjoined. After an hour has elapsed he may gently move on his right side to facilitate the passage of the pills through the pylorus, but he should be allowed no water for three hours at least, and then sparingly. By observing these precautions the pills are generally retained; but should they be rejected the same procedure may be repeated the following day or night. After six or seven hours a sufficiency of water is admissible or any light nourishment desired.

The dose of ipecac should be about 40 or 50 grains the first night (eight or ten pills) and reduced 10 grains each night until only 10 grains are given. Following this somewhat rigorous treatment it is well to continue this 10-grain dose every alternate night for ten days to two weeks.

Given this way ipecac appears almost as a specific, and under

its influence the stools become soft and mushy, but soon lose their dysenteric character, and may assume a normal form in a few days. The amebæ generally disappear almost at once, seldom reappearing, though occasionally they do, and then the treatment has to be repeated in its entirety.

Hypodermic Administration of Emetin. The *modus operandi* of ipecac in its amebacide properties was not well understood until Vedder, in March, 1911, working in Manila, published his findings that a fluidextract of ipecac would kill amebæ in cultures in dilutions as high as 1 to 200,000. The next year Rogers, in Calcutta, found that emetin hydrochloride killed amebæ in stools in dilutions of 1 to 100,000 and began to use this salt hypodermically in cases of amebic dysentery. Since then this preparation has been extensively employed, and favorable reports have come from Asia, Europe, North and South America, and "the isles of the sea."

The dosage recommended by Rogers, and followed by most observers, is from $\frac{1}{3}$ to 1 grain, injected twice a day, daily, or every second day for a week or ten days only.

At present, as contended by Allan, the evidence in regard to the permanence of cure by emetin is extremely meager. In the cases reported by Rogers (32) the active amebæ disappeared promptly after doses of $\frac{1}{3}$ to 1 grain; one case is reported well five months later, and in several of these cases which later came to autospy from other causes no amebæ were found in sections of the gut. There has been no report on the later history of the remainder of this series of cases, but Rogers thinks they are permanently cured.

Many other apparently permanent cures are reported, including either the amelioration or cure of liver abscesses, but there seems rather a paucity of reports following these cases any considerable length of time. Allan, of Charlotte, reported two cases which promptly cleared up and as promptly relapsed.

Most observers admit that the emetin always kills the active amebæ but not the cysts, the latter being responsible for the relapses. Baermann and Heinemann have detailed in full the treatment of twenty-two cases in Sumatra, furnishing some valuable data. They point out that emetin seems to exert but little effect on cysts and that there is considerable variation in the different preparations of emetin now on the market, as cases which proved refractory to one brand sometimes recovered promptly when emetin from a different manufacturer was employed. One important conclusion at which they have arrived is that while emetin is strongly amebacidal there are certain races of emetin-fast amebæ.

The writer has used this salt in four cases, three of which are still well at one year, eleven months, and ten months respectively. The fourth case suffered a relapse after an apparently normal condition of the bowels for two months, but he fell into other hands, so that details and subsequent symptoms are not available.

At present emetin hydrochloride is the salt mostly used. The size of the dose varies from ¼ to 4 grains, and it is also being given by the mouth and rectum—in rare instances intravenously. It is being given daily in single or several doses, on consecutive days, on alternate days, and at irregular intervals. Most observers discontinue it after the clinical symptoms subside or the amebæ disappear from the stools. Allan, a careful and safe clinician, recommends maximum doses—that is, 2 or 3 grains—instead of small doses. As no one has reported bad results except a transient nausea, and as small doses do not satisfactorily eradicate the amebæ, the conclusion of Allan seems sound and practicable.

The employment of emetin should be reinforced by rest in bed, appropriate diet, and other measures indicated for ulcerated intestines, perhaps abscessed liver, and a depleted body. As yet we do not know the best method as to dosage, frequence, or duration of treatment in the administration of emetin, but the mass of clinical reports now being poured into our literature will soon definitely settle these questions.

Injection of Kerosene Oil. This procedure is of recent date and has not come into general use, but is a valuable aid in the management of amebic dysentery. For an adult about 1 pint of pure oil should be employed, and with the patient in the knee-chest position, it should be injected into the bowel with a colon tube. He should keep this position, in an exaggerated manner if possible, for several minutes so that the oil will gravitate well into the colon. This should be retained for thirty or forty minutes and then be permitted to escape, though if all is not at once evacuated no alarm need be felt. R. T. Dorsey reports one case where, through a misunderstanding of orders, the oil was allowed to remain in the bowel over two hours. No ill effects occurred. We have not in any instance depended upon the oil alone in amebic dysentery, but in the stubborn diarrhea accompanying pellagra we have in a number of instances noted marked improvement following this procedure alone after various astringents had failed to afford relief.

This injection may be repeated daily for three or four days, and then occasionally as required. It will be found, however, that not many will be needed, for unless the case is extremely far advanced improvement will promptly set in.

Amebic dysentery, like duodenal ulcer, is probably much more prevalent than has been supposed, and its frequency has been shown by more thorough diagnostic methods. The only way a positive diagnosis of amebiasis can be made is by the microscope, and the finding of the protozoa in the stools. In regions where the disease is endemic and a microscope is not available one can reasonably infer its presence by the most prominent symptoms, namely, abdominal soreness, which is increased on pressure and

extends along the course of the colon, especially when there is maximum intensity over the cecum and ascending colon. I believe with Musgrave, that the presence in the stools of any form of ameba in warm or tropical regions should be considered diagnostic for purposes of treatment, whether or not active symptoms are present.

Thus by carefully examining every suspected case of possible amebic infection and by early and energetic treatment along the lines herein considered this otherwise serious disease can in nearly every instance be promptly and permanently relieved.

THE DIAGNOSIS OF TUBERCULOSIS IN EARLY LIFE.[1]

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This paper has to do with the chronic form of pulmonary tuberculosis in children, and does not consider the acute manifestation of the disease, such as general miliary tuberculosis, tuberculous meningitis, or the acute bronchopneumonic form which complicates or follows some one of the acute infectious diseases; nor does it consider the surgical aspects of the disease. There are two reasons for this: In the first place, children suffering from the disease in any of the forms above mentioned usually are taken to the general hospitals and are rarely seen in a dispensary devoted exclusively to tuberculous patients, and in the second place, while individual cases may present difficulties in making a diagnosis, the clinical picture in the majority of cases of this type is usually readily recognized.

Excluding the types just mentioned the recognition of tuberculosis in children is either extremely easy or most difficult, the determination of a positive or negative finding depending almost entirely on the attitude of the particular observer. Thus, in some instances, all children having a tuberculous parent have been considered as being likewise tuberculous. In others the occurrence of a positive tuberculin reaction or the presence of palpable lymph nodes in the neck have been considered as sufficient evidence to designate the child as having tuberculosis.

[1] Read before the Philadelphia Pediatric Society, May 12, 1914.

The reason for the current belief that tuberculosis is an extremely common finding in children, particularly in children of the poorer classes, is largely due to the general acceptance of the theory that infection with tuberculosis is commonly acquired in childhood. That this is true in many, possibly the majority, of cases everyone agrees. That it is invariably the case, however, has not been proved. The theory that infection in childhood is the universal one, if it could be shown conclusively to be true, would at once dispel all the uncertainties regarding the etiology of the disease; and furthermore, it would change very radically our procedures in the way of prevention.

At first sight the etiology of tuberculosis seems perfectly clear. If, however, we analyze the subject more closely we are forced to admit that we know very little about it. This may seem to be putting the question too strongly; but let us examine some of the facts and see how matters stand. That infection with the tubercle bacillus is widespread, and, furthermore, that it commonly occurs early in life, is practically universally acknowledged. So far we stand on reasonably firm ground. When, however, we attempt to explain why relatively few of those thus infected develop tuberculosis which is clinically recognizable while the majority of infected individuals pass through life with no manfestations of the disease we can only hazard a surmise.

A number of factors must be considered—namely, the question of hereditary predisposition, the influence of race, poor food, bad housing conditions, overwork, mental worry, acute illness, dissipation, and, lastly, reinfection later in life. Anyone of these may be sufficient to lower the resistance of the individual to a point where the natural defences of the body can no longer keep in check the multiplication and spread of tubercle bacilli already within the body. It seems apparent, therefore, that while many children may receive an implantation early in life the determining factor as to whether they become openly tuberculous later in life is dependent on a number of factors, most of which have to do with unsanitary evils. For the most part the problem becomes one of a diagnosis of the social surroundings of the child rather than of its physical condition. It is, of course, understood that the same effort should be made with children as with adults to recognize those having true clinical tuberculosis.

The present study relates to 362 children examined at the Phipps Institute between three and four years ago. The majority of them were brought for examination because of tuberculosis in one or the other parent and not because the children themselves had any symptoms. Reports as to the condition of 111 of these children have been obtained within the past two or three months. The examination of these children was made by five men on the dispensary staff and a study of the records affords a good illustration

of the points of view of different observers. Of the 362 a positive diagnosis of tuberculosis was made in 96 (26.5 per cent.). In studying the records the conviction cannot be escaped that this percentage is either too low or too high for the reason that many cases designated as non-tuberculous could readily be classed as having tuberculosis, and *vice versa*. In other words, undoubted evidence of tuberculosis was present in but a few; in the remainder the individual's point of view seemed to be the determining factor in making a positive or negative diagnosis. It might be well to mention at this point that of the 111 of these children recently heard from, 25 had a diagnosis of tuberculosis over three years ago. All of these children are reported as well except 2, 1 of whom recently died of tuberculosis and 1 of a cause unknown.

Symptoms. The symptomatology of tuberculosis in adults, while subject to many vagaries, is invaluable in making a diagnosis. Indeed in many cases of incipient tuberculosis it is our chief reliance in determining the nature of the trouble. In children, on the other hand, we are deprived of much of the value of symptoms, because of the inability of young children to give a correct description of their trouble; and in the case of the present group the difficulty is augmented by reason of the fact that they are for the most part, the children of foreign parents, who, in many instances, are almost as useless as the children themselves so far as giving a history of the illness is concerned.

Temperature. One of the most reliable means of detecting early tuberculosis in the adult is the slight rise in temperature which may occur daily or only every few days. In children, however, little reliance can be placed in these slight elevations of temperature, for the reason that growing children normally have a higher temperature than adults. Landois[2] gives as the normal limits 99.5° to 100.1° F. (37.87° to 37.62° C.) in children from five to nine years; 190 of the 362 children had a temperature of from 99° to 100° F. The reason for this is, in all probability, a more active metabolism, although other influences of undetermined origin may also, in part, be contributory; 143 (31.3 per cent.) complained of cough. As a rule this was of but a few days' duration; 223 (61.6 per cent.) stated that there was no expectoration. The sputum of 37 was examined, with negative results. Hemoptysis was said to have occurred in 16. Chest pain was complained of in 95. Hoarseness of a transient character was noted in 48 and persistent hoarseness in 9. Night sweats occurred in 52.

Cough, if it has persisted for weeks, hemoptysis, and persistent hoarseness would have the same significance in the child as they do in the adult.

Physical Signs. In taking up the question of physical signs in the chests of infants and young children we have to consider

[2] Text-book of Human Physiology, 10th ed., p. 391.

what is probably the most difficult phase in the art of physical diagnosis. And while it is true that the underlying principles which enable us to detect disease in the chest are the same, whether it be adult or child, there are certain differences between the two which must be kept in mind. Generally speaking the man whose training has been confined to the examination of adults alone, or children alone, is likely to draw false conclusions when he invades one or the other field, and much that has been written regarding the presence of chronic tuberculous lesions in the lungs of children has been contributed by those whose standards have been obtained by the examination of adults with tuberculosis.

Furthermore, it must be borne in mind that the clinical forms of human tuberculosis in different ages possess correspondingly different anatomical features, a knowledge of which is necessary for the understanding of the interpretation of physical signs. In the majority of instances, tuberculosis, when it involves the lungs of infants and young children, is bilateral, widespread (either of the miliary or bronchopneumonic form), and acute in character.

In the adult, on the other hand, the disease begins at one or the other apex, follows a fairly definite course in its progress, and is chronic in character, although subject to periods of acute activity. As a rule the clinical manifestations of tuberculosis as they occur in infants and young children differ from the adult type, and this is not altered by the fact that the juvenile type may occur in adults, and *vice versa*.

It is not altogether easy to fix definitely the age period at which the signs peculiar to children cease. Some have arbitrarily fixed this limit at the age of six years, although in our judgment ten years would be more nearly correct.

Probably the most distinctive difference between the adult and the child is that in the latter all of the sounds are exaggerated. Not only is the breathing of the familiar puerile type, but all the vocal sounds are increased, and in addition the percussion note is commonly hyperresonant.

As an illustration of how the exaggeration of physiologically normal signs may be misinterpreted in the child it is interesting to note that of 79 children in this group who were charted as having abnormal physical signs no less than 67 had impairment and bronchovesicular breathing at the right apex. It will be recalled that in the adult the right apex normally has a slightly impaired note, prolonged expiration, and increased fremitus, and that the explanation of this was pointed out by Fetterolf[3] as being due to close proximity of the trachea to the right upper lobe. The very high proportion of cases in this group, with apparent disease at the

[3] Archives of Internal Medicine.

right apex, would seem to indicate that what was in reality a normal finding was interpreted as being pathological.

One's belief in this is strengthened from the result of reports on 111 of these children three or four years after the first observation. Of these 111 cases 17 were noted as having a diseased right apex, and in 2 more both apices were supposed to be affected. At the present time 17 of the 19 are noted as being in good health, 1 has died of tuberculosis, and 1 still has some cough.

In addition to the exaggeration of the breath sounds already noted the respiratory sounds in children are subject to a number of vagaries, and the younger the child the more difficult is the interpretation of the auscultatory signs.

The expired air may, for instance, be directed into the pharyngeal vault or against the roof of the mouth, with the result that a bronchial quality of breathing is heard all over the chest. This can be obviated if the child is old enough to learn how to breathe properly. Then again in young children and infants the lungs at times seem to move independently of one another, with the result that loud puerile breathing is heard over one side, while over the opposite side the breath sounds are almost inaudible, and this condition shifts from side to side. This peculiarity is often due to faulty posture. If care is not taken to see that the child sits straight, and that one or the other side is not held tense, not only will there be very faint or nearly absent breath sounds on the cramped side, but in addition the percussion note may be impaired, or indeed absolutely dull. We have often demonstrated this fact to students and shown them how the signs on the two sides can be almost instantly reversed. This fact is worth remembering, as the unwary may make a diagnosis of pneumonia or pleural effusion.

In adults one of the most valuable means of detecting early pathological changes at the apex is the restriction of expansion over the affected area. In children this procedure is almost useless, except in a few of the older ones, because of jerky movements, and what has seemed to us to be often the case, the fact that the lungs of infants and young children do not seem to possess the same synchronous movement that the adult organs possess.

Lymph Nodes. In nearly every article dealing with the diagnosis of tuberculosis in children great stress has been laid on the presence of palpably enlarged cervical lymph nodes. Indeed in not a few instances, in which surverys of large groups of children have been made, this apparently has been the only evidence on which the diagnosis was made. The fact has been ignored that the age of childhood is likewise known as the lymphoid age, and that all children, irrespective of their social condition, have lymph nodes which are readily palpable. The enlargement of the lymph nodes is not readily detected until about the second year, but

from then on until shortly before or after the age of puberty this is the case, although as the child approaches adolescence certain groups, such as the epitrochlear, the axillary, and the inguinal, tend to shrink in size and become less easily detected. The submaxillary node at the angle of the jaw is usually the largest under normal conditions, and is usually the last to shrink to a size that it can no longer be palpated.

In our experience all of the superficial lymph nodes can be palpated readily in the majority of cases if the children are systematically examined from this standpoint.

To confine the examination to one group, such as the cervical and because the nodes in this situation are palpable, to assume that it is an evidence of tuberculous infection does not seem in any way justifiable, especially so in view of the fact that all the lymph nodes of the body are hypertrophied according to adult standards.

If there exist in the neck a single large node or a tumor mass made up of a number of nodes, which are matted together and adherent to the surrounding tissues, the presumption is strong that we have to deal with a tuberculous adenitis, and especially so if there is evidence of softening, or the overlying skin is inflamed. This, however, is true scrofula, and has nothing to do with nodes which vary in size from that of a bean to a split pea, or smaller, which are freely movable, and which manifest neither softening nor inflammation.

Of the 362 children here reported the records show the following results: cervical, 250; submaxillary, 202; axillary, 209; epitrochlear, 94; inguinal, 212.

It is to be borne in mind that the above records are of positive value almost entirely, and that the discrepancies between the different groups are largely because the examination was not complete.

Still another group of lymph nodes must be considered, namely, the bronchial. Of recent years a great deal has been written on the physical signs and symptoms of tuberculous enlargement of this group, especially the former. Some writers have reported quite a high percentage of cases in which this condition existed. Much of the evidence on which such a diagnosis is made seems open to question, especially from the standpoint of physical signs. In our opinion the alleged percussion changes, such as the semilunar areas in the second and third interspaces anteriorly and the vertebral dulness posteriorly, which are supposed to be indicative of such enlargement, are fanciful rather than real, and the questionableness of such findings has been shown by Gittings and Fetterolf[4] in their work on frozen sections of the thoraces of infants and young children.

[4] Some Anatomical Features of the Child's Thorax; Their Application in Physical Diagnosis, Amer. Jour. Dis. of Children, 1911, vol. i.

X-ray studies made by Pancoast of children in whom we suspected this condition might exist have given negative results in the majority of instances. The mere fact that these nodes may show some enlargement on *x*-ray examination is no proof that they are pathologically enlarged in view of the fact that we know all the superficial nodes are hypertrophied normally.

The truth of the matter is that this diagnosis is not easy. Children below par and who have a persistent hard, brassy cough, usually unproductive, seem to be the ones most likely to suffer from this condition.

In this connection it may not be amiss to say something regarding the tonsils, as they are regarded by many as portals of entry for the tubercle bacillus. Here again we are dealing with lymphoid tissue, which in children is excessive, and which, as the years pass, tends to shrink until the relatively large tonsil of the child is transposed to the atrophied one of old age. The removal of tonsils which are enormously enlarged, and which are associated with frequent colds, or inflammation of the tonsils themselves, is one thing, but the wholesale massacre of these organs simply because they are enlarged, according to adult standards, is in our opinion a mistake. Our records show that of 290 children examined from this standpoint 110 were noted as having some enlargement of the tonsils.

Mouth-breathing was noted in 144, although adenoids were detected in but 24. These latter figures are not trustworthy, however, as but a small percentage had a skilled nose and throat examination.

Teeth. While the condition of the teeth has no direct bearing on the diagnosis of tuberculosis in growing children it is coming to be recognized more and more that the general health of the child may be adversely affected by a large number of badly decayed teeth. Thus bad teeth may be one of the contributing factors in lowering the general resistance and permitting the latent tuberculous infection to gain the upper hand.

Of the 191 children examined as to the condition of their teeth, 48 were classed as good, 69 as fair (that is but two or three decayed teeth), and 74 as being very bad.

Tuberculin Tests. The accepted belief at the present time is that a positive reaction to one of the tuberculin tests is indicative of a tuberculous lesion somewhere within the body. A positive test does not mean, however, that the individual has clinical tuberculosis. It must clearly be kept in mind that there is a great difference between tuberculosis that is clinically recognizable and hypersensitiveness to tuberculin. Hypersensitiveness is extremely common, and is encountered in a large proportion of children, the frequency with which it is met increasing rapidly from the second to the fifteenth year. It is a great mistake to assume that because

a child reacts to some one of the tuberculin tests that it is tuberculous in the sense that it needs active treatment; and, as we shall later point out, a negative tuberculin test does not entirely free us from responsibility.

In regard to the tests themselves there are certain facts which should be kept in mind. First as regards the subcutaneous test. This is rarely employed in children, especially the very young ones. At one time the test was extensively used in adults and a positive reaction was, and by many still is, regarded as conclusive proof that the individual has tuberculosis. Of recent years, however, some observers have warned against its use, pointing out that the test is capable, in certain instances, of stirring an inactive lesion into an active one. Furthermore, there is now a tendency not only to limit the use of the test, but in addition to ignore the constitutional symptoms of a reaction (such as fever, joint pains, local reaction, etc.) and to call positive only those cases which give a focal reaction, such as rales at a suspected apex, or some pain, redness, and swelling in a suspected joint.

The cutaneous or von Pirquet test has achieved enormous popularity by reason of its simplicity, and also because it is widely credited with being positive evidence of tuberculosis. In children under two years of age it is valuable evidence when positive and usually means clinical tuberculosis. Beyond the second year, however, it loses much of its positive value, and the older the child the more unreliable it is as an evidence of true tuberculosis.

The percutaneous or so-called Morro test has about the same significance.

Finally we have to consider the conjunctival test introduced by Wolf-Eisner and Calmette. The majority of observers have come to regard this test as dangerous, because of the possibility of producing an inflammatory condition which may lead to serious damage of the eye. According to Hamman and Wolman,[5] who have employed the test in a large series of cases, the test is free from danger, and is superior to the Morro and von Pirquet tests in that it is not so sensitive and that a positive reaction points strongly to an active rather than a latent process, especially so when supported by other indications.

Of the 361 children under discussion, 100 gave a positive and 93 a negative von Pirquet reaction. This does not represent the total number given the test, as many more received it but did not return to the dispensary to see whether the reaction was positive or negative.

The question naturally arises, What is the practical value of the von Pirquet or Morro test in determining the children who have true tuberculosis and those who can be disregarded? We are

[5] Tuberculin in Diagnosis and Treatment, 1912.

forced to conclude that they are of little value except as an evidence of hypersensitiveness. We have repeatedly seen anemic, undernourished children with or without tuberculous parents who gave no reaction; and, on the other hand, we have encountered children who presented no physical signs who were in robust health and who had violent skin reactions.

Sociological Conditions. The really important thing to determine in regard to these children is this: Are they physiologically normal, and if they show any evidence of being below par, what is the cause? In the great majority of instances it will be found that those below the normal are suffering from sociological evils rather than tuberculosis. Viewed in this light it is relatively unimportant whether the child shows evidences of hypersensitiveness or not, because if allowed to remain amid unsanitary surroundings it will quite likely become infected, or if infection has already occurred the chances of true clinical tuberculosis developing are greatly enhanced.

It has been recognized for some years that the tuberculosis problem is a complex one and one that is not to be solved by purely medical procedures, so that in determining the question as to whether a child is in need of preventive treatment we are in the majority of cases confronted with a condition of malnutrition, partly the result of poor and insufficient food and partly the result of unsanitary living conditions. In other words, we have not discharged our duty to the child by simply saying that he has or has not tuberculosis.

Thus the general appearance of 141 of the 362 children was noted as being bad, while of 155 whose weight was recorded, 82, or 52.9 per cent., were found to be under weight for their age.

The term "pretuberculous" has been applied to that large group of children who, while not clinically tuberculous, are objects of suspicion, either because of tuberculous parentage, poor living conditions, or who are themselves badly undernourished. The term "pretuberculous" has been objected to, but as it has come to be so generally understood that it means children who, if allowed to drift, are prone to become actively tuberculous, that we can see no great reason for not using it.

Certain interesting facts are revealed as to the social conditions of the 362 children forming the basis of this paper, and while none of the facts are new, they will bear repeated emphasis.

These 362 children belonged to 210 families. What constitutes a proper income for a family of three or five or seven is somewhat conjectural, depending as it so often does on habits of thrift or extravagance. It is usually assumed, however, that not more than one-quarter of the income should be expended for rent, and that the food allowance should be $1.50 per week per capita, approximating 21 cents per capita each day. Of 154 families studied on

this basis the number with an adequate income was 68, or 44.17 per cent., while 86, or 55.83 per cent., had an inadequate income; 50 families were paying an excessive rent.

The following table shows the extent to which over-crowding exists:

Families living in	1	room	to each	member		102
" "	1	"	2	members		70
" "	1	"	3	"		25
" "	1	"	4	"		8
" "	1	"	5	"		2
" "	1	"	6	"		2
" "	1	"	7	"		1
Total						210

Distinct overcrowding occurred in 38, or 18 per cent., of the 210 families.

Still another aspect of the problem is seen in the following table, which shows the number of rooms occupied by each family:

Families living in	1	room		17
" "	2	rooms		39
" "	3	"		52
" "	4	"		42
" "	5	"		20
" "	6	"		29
" "	7	"		4
" "	8	"		4
" "	11	"		1
" "	13	"		1
" "	14	"		1
Total				210

No data is available as to the hygienic conditions of these families at the time of the original examination, but we do know the conditions under which 111 of the children are at present living. A recent investigation shows that 48, or 46.2 per cent., of the children are living in poor, dirty, and unhygienic surroundings, while 13, or 11.7 per cent., of the home conditions are classed as only fair. The remaining 50 are living in clean surroundings.

Two facts are now well known: (1) that both the morbidity and mortality rates are always higher among those living under unsanitary conditions; and (2) that there is almost instant improvement in children when they are given sufficient nourishing food and healthful surroundings. The latter fact is now well established by reason of the results obtained in open-air schools and in sanatoria which admit children of the so-called pretuberculous type.

We would, therefore, repeat that the main problem consists in determining whether the child is physiologically normal, and if not, of using every endeavor to provide the means of making it so.

THE DIFFERENCE IN THE MORPHOLOGY OF BLOOD IN GASTRIC ULCER, DUODENAL ULCER, AND IN CHRONIC APPENDICITIS, BASED UPON FIFTY OPERATIVELY DEMONSTRATED CASES.[1]

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It is unnecessary to enter into a discussion of the difficulty, in a large number of cases, of differentiating between gastric and duodenal ulcer and between these and chronic appendicitis, for the reason that their symptoms and signs are frequently alike.

The object of this paper is to show that correct interpretations of blood-findings in these pathological affections may be of great aid to the clinician for the differential diagnosis, and especially in cases where all hitherto known methods of examinations, including *x*-rays, fail to clear up the situation. In other words, it is our intention to show that there is a difference in the blood-picture between gastric ulcer, duodenal ulcer, and appendicitis.

While partial attention has been paid to the blood in appendicitis, this cannot be said about the blood in ulcers of the stomach and duodenum. To the frequency of polycythemia in non-hemorrhagic duodenal ulcer reference was made in three previously published papers.[2] Our hematological studies convinced us, too, that the morphology of the blood differs in gastric ulcer with the site of the lesion in the viscus. In patients with pyloric ulcers the blood-picture varies from that of non-pyloric ulcers.

Material. Our studies are based upon a large material, but as cases without operative evidence may be open to criticism, we shall refer only to fifty operatively demonstrated cases.

The material, which was drawn from the Vanderbilt Clinic and from our private practice, consists of 12 gastric ulcers in ten males and in two females, 18 duodenal ulcers in fifteen males and in three females, and 20 cases of appendicitis in ten males and in ten females.

For the reports of operative findings I am indebted to the following surgeons: Dr. Charles Peck, 17 cases (3 gastric ulcers, 4 duodenal ulcers, and 10 cases of appendicitis); Dr. G. E. Brewer, 3

[1] Read before the Section of Medicine, New York Academy of Medicine, April 21, 1914.

[2] Friedman, G. A., A Hitherto Undescribed Form of Polycythemia and its Possible Relation to Duodenal Ulcer, Chronic Pancreatitis, and a Disturbance of Internal Secretions (Epinephrin), Medical Record, October 18, 1913; Weitere Erfahrungen über Polyzythemie beim chronischen uncomplizierten Duodenalgeschwuer, Arch. f. Verdauungskrankheiten, Band xix, Ergaenzungsheft, 1913; The Value of Polycythemia for the Diagnosis of Duodenal Ulcer, Based upon Sixteen Operatively Demonstrated Cases, Medical Record, May, 1913.

cases (1 gastric ulcer and 2 appendicitis); Dr. Charles Dowd (1 duodenal ulcer); Dr. A. A. Berg, 18 cases (5 gastric ulcers, 8 duodenal ulcers, and 5 appendicitis); Dr. A. G. Gerster, 5 cases (2 gastric ulcers, 2 duodenal ulcers, and 1 appendicitis); Dr. W. Linder, 2 cases (1 gastric and 1 duodenal ulcer); Dr. F. Kamerer, 1 case (appendicitis); Dr. G. D. Stewart, 1 (duodenal); Dr. Charles Goodman, 1 (duodenal); Dr. M. Bookman, 1 case (appendicitis).

TABLE I.—Gastric Ulcer. Operative Findings.

1. Double ulcer (indurated) at lesser curvature, anteriorly and posteriorly proximal to cardia.
2. Callous ulcer of the size of a quarter (United States currency) at lesser curvature, very near to cardia.
3. Callous ulcer (posterior wall near cardia).
4. Indurated ulcer at lesser curvature about two inches from pylorus.
5. Indurated ulcer at pylorus.
6. Indurated ulcer near pylorus.
7. Ulcer at anterior surface of pylorus.
8. Callous ulcer at pylorus.
9. Indurated ulcer at pylorus.
10. Double ulcer at pylorus and lesser curvature near cardia.
11. Ulcer near pylorus posteriorly.
12. Pylorie ulcer and obstruction.

TABLE II.—Gastric Ulcer. Blood.

Number.	Hemoglobin, per cent.	Red-blood cells.	White-blood cells.	Polynuclears.	Small lymphocytes.	Small mononuclears.	Large lymphocytes.	Large mononuclears.	Eosinophiles.	Basophiles.	Transitionals.
1	60	5,800,000	16,120	86.0	13.0	0.0	0.0	0	0.0	0.0	1.0
2	110	6,030,000	11,200	63.5	30.0	2.0	1.5	0	1.5	0.0	1.0
3	89	5,200,000	13,400	69.0	20.5	1.5	3.5	0	2.5	0.0	3.0
4	83	5,780,000	10,600	75.0	15.5	2.0	2.5	0	0.5	0.0	3.5
5	70	3,900,000	4,800	46.0	30.0	17.0	3.0	0	4.0	0.0	0.0
6	55	3,400,000	4,840	44.0	36.0	15.0	0.0	0	4.5	0.5	0.0
7	65	5,380,000	5,600	71.0	15.0	10.0	0.0	0	4.0	0.0	0.0
8	65	4,520,000	9,800	52.0	31.0	12.0	0.0	0	3.5	0.0	0.1
9	72	4,360,000	4,100	48.0	13.0	16.0	2.0	0	4.0	0.0	0.0
10	85	4,390,000	12,600	60.0	25.0	0.0	0.5	0	3.5	0.5	0.5
11	70	4,300,000	6,800	55.0	30.0	8.0	2.0	0	4.0	1.0	0.0
12	65	5,459,000	9,800	75.0	14.0	8.0	1.5	0	0.5	0.0	1.0

Table I indicates that in 10 cases the ulcers were single and in 2 double (Cases 1 and 10). In Cases 2, 3, and 4 (single ulcers) and in Case 1 (double) the site of the lesion was at the lesser curvature proximal to the cardia. One of the ulcers in Case 10 was found at the same region of the lesser curvature, and the second ulcer at the pylorus. In 5 cases (5, 7, 8, 9, and 12) the site of the ulcers was at the pylorus, without causing obstruction except in Case 12. In Cases 3 and 11 the ulcers were found to be prepyloric or parapyloric.

In order to avoid repetitions the gastric ulcer cases are divided into two groups: (1) non-pyloric, where the lesion was at lesser curvature, nearer the cardiac orifice, and (2) pyloric group, where the lesion was at the pylorus or very near to the pylorus (parapyloric or prepyloric)

Case 10, with ulcers at the pylorus and lesser curvature, nearer to the cardia belongs to both groups.

The average percentage of hemoglobin was for the non-pyloric group	85
The average percentage of hemoglobin was for the pyloric group	65
Average	75
The average number of red-blood corpuscles was for non-pyloric	5,700,000
The average number of red-blood corpuscles was for pyloric	4,463,000
Average	5,081,000

The somewhat higher counts of red-blood corpuscles in Cases 7 and 12 in the pyloric group were probably due to concentration of blood, as frequent vomiting is noted in the histories of these cases.

White-blood Corpuscles. Mild leukocytosis was present in the four cases of the non-pyloric group and in the case which belonged to both groups. There was no leukocytosis in the pyloric group, but frequently leukopenia.

Lymphocytes. A relative lymphocytosis was frequently found in the pyloric group, but no lymphocytosis in the non-pyloric.

Small mononuclears were markedly increased in the pyloric group, showing no increase in the non-pyloric.

A marked increase in large lymphocytes was not noted in either of the two groups.

Large mononuclears were absent from the blood in the two groups.

A relative increase in eosinophiles (4 per cent. and 3.5 per cent. was present in the pyloric group with the exception of Case 12 (pyloric obstruction). There was no relative eosinophilia in the non-pyloric group.

An increase in transitionals was noted in 2 cases of the non-pyloric group, but no increase in the pyloric group.

CHARACTERISTICS OF THE TWO GROUPS.

Pyloric group.	Non-pyloric group.
Anemia.	Polyglobulia.
Absence of leukocytosis.	Leukocytosis.
Relative lymphocytosis.	Absence of relative lymphocytosis.
Increased small mononuclears.	No increase in small mononuclears.
Relative eosinophilia.	Absence of relative eosinophilia.
No increase in transitionals.	Occasional increase in transitionals.

CHIEF CHARACTERISTICS.

Pyloric group.	Non-pyloric group.
Anemia.	Polyglobulia.
Absence of leukocytosis.	Leukocytosis.
Relative eosinophilia.	Absence of relative eosinophilia.

REMARKS. The determinations of the percentage of hemoglobin were made with the Sahli hemoglobinometer. The complete blood-examinations were made while the patients were on fasting stomach (early in the morning). The smears for differential counts were stained with Jenner's stain. As a rule not less than 200 white-blood corpuscles were counted. A differentiation was always made between small mononuclears and small lymphocytes. As small mononuclears were counted such of the small lymphocytes which showed a distinct nucleus, otherwise they were counted as small lymphocytes. There was also made a distinction between large lymphocytes and large mononuclears. The examinations of the blood in the cases of gastric ulcer, as in the following cases of duodenal ulcer and chronic appendicitis, were made repeatedly.

TABLE III.—Duodenal Ulcer. Operative Findings.

1. Broad scar.
2. Double ulcer; gastric and duodenal.
3. Ulcer at posterior wall and two gall-stones.
4. Ulcer at anterior wall.
5. Ulcer at posterior wall.
6. Scar at first portion and gall-stones.
7. Broad adhesions between first portion and gall-bladder. No stones.
8. Broad scar and adhesions.
9. Soft ulcer.
10. Perforated ulcer.
11. Soft ulcer at first portion and esophageal carcinoma adherent to aorta.
12. Broad adhesions between first portion and gall-bladder. No stones.
13. Scar and soft ulcer at first portion.
14. Ulcer at anterior wall.
15. Broad scar.
16. Ulcer at anterior wall.
17. Ulcer at anterior wall, chronic appendicitis, and gall-stones.
18. Ulcer at posterior wall and chronic appendicitis.

TABLE IV.—Duodenal Ulcer. Blood.

Number.	Hemoglobin, per cent.	Red-blood cells.	White-blood cells.	Polynuclears.	Small lymphocytes.	Small mononuclears.	Large lymphocytes.	Large mononuclears.	Eosinophiles.	Basophiles.	Transitionals.
1	95	6,700,000	8,740	57.0	41.0	1.0	0.0	0.0	0.0	0.0	1.0
2	90	6,576,000	14,960	63.0	33.0	0.0	2.0	0.0	2.0	0.0	0.0
3	82	5,660,000	7,600	64.4	25.5	0.0	3.27	0.0	1.4	0.0	4.6
4	112	6,510,000	9,000	69.0	22.5	4.5	0.0	0.0	3.0	0.5	0.5
5	100	5,730,000	8,800	65.5	17.5	10.0	0.0	0.0	1.5	1.0	4.5
6	80	5,580,000	9,100	54.0	33.0	1.0	7.0	0.0	0.5	0.5	4.0
7	90	6,000,000	8,920	65.0	30.5	1.5	0.0	0.0	0.5	0.5	2.0
8	85	4,300,000	4,500	52.0	35.0	7.0	1.0	0.0	4.0	0.5	0.5
9	65	4,473,000	7,600	73.0	17.0	7.0	1.0	0.0	3.0	0.0	0.0
10	94	5,130,000	21,000	75.0	16.0	2.5	0.0	0.0	2.0	0.0	2.0
11	86	5,800,000	6,000								
12	96	5,600,000	5,600	64.0	31.0	0.0	0.0	0.0	1.0	0.0	4.0
13	100	6,400,000	8,060	60.0	30.0	2.0	2.0	0.0	1.0	0.0	5.0
14	120	5,700,000	8,060	61.0	38.0	0.0	0.0	0.0	0.5	0.5	0.0
15	70	6,630,000	9,940								
16	90	7,610,000	9,800	58.0	37.0	0.0	1.5	0.0	1.0	1.0	1.5
17	100	6,720,000	9,200	55.0	26.0	8.5	1.0	2.0	5.0	0.5	2.0
18	100	6,060,000	8,200	71.5	14.0	4.0	4.0	1.0	1.5	0.5	3.5

Table III indicates that the lesions were all at the first portion of the duodenum. In 8 cases callous or indurated ulcers were found, in 4 scars, in 2 soft ulcers, in 1 soft ulcer and scar, in 1 perforated ulcer, in 2 broad adhesions between the duodenum and the ball-bladder, without stones in the latter.

In Case 2 double ulcer was found (duodenal and gastric near the cardiac orifice). This case therefore belongs to the duodenal and non-pyloric groups. In Cases 3, 6, and 17 gall-stones were likewise found. In Cases 17 and 18 chronic appendicitis, which also was present, necessitated appendectomy. Case 9 was the only one of bleeding ulcer. Case 11 came to operation originally for carcinoma of the esophagus. In exploration of the viscera a soft ulcer at the duodenum was detected, which did not give a single symptom or sign pointing to the condition found. In all the cases with the exception of Cases 6 and 11, gastro-enterostomy was done.

Table IV indicates that the average percentage of hemoglobin for duodenal ulcer was 90. The average number of red-blood corpuscles was 6,000,000. Polycythemia was found in 15 cases out of 18, or in 83 per cent.

There was no leukocytosis present except in the case, which also belonged to the non-pyloric group and in the case of perforated ulcer. Occasionally leukopenia was present.

There was no relative lymphocytosis.

An increase in small mononuclears was rarely noted.

Relative eosinophilia (4 per cent. and over) was marked only in 2 cases; in Cases 8 and 17 (duodenal ulcer and appendicitis).

Large mononuclears were absent in all the cases of duodenal ulcer except in the two in which appendicitis was likewise found. An increase in transitionals was noted frequently.

REMARKS. The blood of the patients who remained under observation after gastro-enterostomy was examined in shorter or longer intervals after operation. The blood-picture remained the same with reference to polycythemia and other findings.

Characteristics for non-hemorrhagic duodenal ulcer are: Polycythemia; absence of relative lymphocytosis; absence of relative eosinophilia. Chief characteristic: polycythemia.

As histories of patients with examinations of feces were given elsewhere, here it should only be mentioned that the presence of occult blood in the stools is not as frequent as it is generally believed. A history of repeated intestinal hemorrhages was given in Case 9, in which the blood showed anemia.

From 17 cases of non-bleeding ulcers in only 2 polycythemia was absent; the value of the latter for the diagnosis of non-bleeding duodenal ulcer is very evident.

TABLE V.—Appendicitis. Operative Findings.

1. Fibrinous appendicitis.
2. Chronic and adhesions.
3.
4. Adherent appendix.
5. Mild, chronic.
6. Chronic.
7.
8. Gangrenous.
9. Fibrinous.
10.
11. Congested appendix and bands around.
12. Chronic appendicitis with concrements.
13. Chronic.
14.
15. Chronic and appendicitis.
16. Chronic and adhesions.
17. Constricted appendix.
18. Chronic and adhesions.
19. Constricted and adhesions.
20. Chronic and adhesions.

TABLE VI.—Appendicitis. Blood.

Number.	Hemoglobin, per cent.	Red-blood cells.	White-blood cells.	Polynuclears.	Small lymphocytes.	Small mononuclears.	Large lymphocytes.	Large mononuclears.	Eosinophiles.	Basophiles.	Transitionals.
1	75	4,000,000	7,400	55.0	34.0	5.0	2.5	1.5	0.0	0.0	2.0
2	80	5,190,000	7,800	72.5	18.0	5.0	1.5	0.5	0.5	0.0	2.5
3	74	6,100,000	3,940	58.0	30.0	2.0	2.0	2.5	0.0	0.5	4.0
4	89	5,070,000	14,000	59.0	23.0	8.0	1.5	0.5	3.5	0.0	3.0
5	82	4,590,000	13,400	60.5	21.0	3.0	1.0	0.0	1.0	0.5	2.0
6	78	4,710,000	8,600	64.0	21.0	7.0	0.0	1.0	0.0	2.0	5.0
7	80	5,330,000	27,400	79.0	13.5	3.0	0.0	1.0	0.0	0.5	3.5
8	90	4,600,000	11,800	51.5	35.0	6.0	0.0	0.0	4.0	0.5	1.0
9	75	4,395,000	18,000	86.0	10.0	0.0	0.0	1.0	0.0	0.0	3.0
10	85	5,341,000	14,240	82.0	11.0	4.0	0.0	2.0	0.0	0.0	1.0
11	102	8,160,000	11,400	63.0	18.5	3.5	4.5	0.0	4.0	0.5	5.0
12	103	7,650,000	6,400	69.0	21.0	1.0	5.0	0.5	0.0	0.5	1.5
13	80	3,700,000	5,800	57.0	41.0	0.0	0.0	1.5	0.5	0.0	0.0
14	75	4,100,000	13,600	72.0	18.0	6.0	0.0	1.0	0.0	0.0	3.0
15	100	4,780,000	11,400	61.5	12.5	11.0	2.0	1.5	7.0	0.5	4.0
16	75	4,780,000	11,800	59.5	20.0	9.0	1.0	2.0	1.5	0.0	7.0
17	95	6,480,000	12,800	65.0	21.5	5.0	3.5	0.5	0.5	0.5	3.5
18	90	5,000,000	12,200	58.0	19.5	12.5	2.5	1.0	4.5	0.0	2.0
19	88	4,920,000	22,400	64.5	11.0	13.5	2.0	1.0	0.5	0.0	7.5
20	80	4,610,000	6,200	65.5	14.5	14.5	1.0	0.5	1.0	0.0	2.0

It is evident from Table V that 20 cases proved to be appendicitis. In nearly all the cases the stomach, duodenum, and pancreas were explored and were found to be normal. In doubtful cases the appendix was examined by the pathologist and found to be diseased.

In Table VI it will be seen that the average percentage of hemoglobin was 84, the average number of red-blood corpuscles 5,165,000. In 3 cases polycythemia was found, although the hemoglobin in 1 case (3) was much lower in comparison with the number of red-blood cells. The frequency of polycythemia in our cases of appendicitis would be as 3 to 20, or 15 per cent. In the remainder the number of red cells was normal or below normal. Leukocytosis was found in 13 cases, or in 65 per cent. and in 1 case leukopenia. The frequent occurrence of large mononuclears and the increase in tran-

sitionals should be noted. The large mononuclears were absent from the blood only in three cases of appendicitis.

Chief characteristic for appendicitis: Large mononuclears, transitionals, and leukocytosis.

One can see from all the tables that there is a relationship and difference in the blood of pyloric, non-pyloric and duodenal ulcers, and appendicitis. The blood in non-pyloric ulcer is related to the blood of duodenal ulcer so far as erythrocytes, lymphocytes, eosinophiles, and transitionals are concerned, but differs in regard to the number of leukocytoes. The presence of leukocytosis in non-pyloric ulcer makes the blood in this condition related to appendicitis. The most striking difference is found between the blood of pyloric ulcer and non-pyloric and duodenal ulcers.

The difference in the morphology of blood led us to construct types of blood-pictures in the mentioned conditions: Pyloric, non-pyloric, and duodenal types. The blood-picture in appendicitis, although it has a special characteristic, large mononuclears, which were absent from the blood in the ulcers of stomach and duodenum, does not represent a special type, but it is a combination of types.

The accompanying diagram illustrates what is meant by types and by combined types: Three lines are drawn from points of the first portion of the duodenum, pylorus, and lesser curvature, cardiac portion. They all meet at a point of the appendix. The spaces between the lines represent the combinations. The following combinations are therefore possible in appendicitis: duodenal, pyloric, and non-pyloric; duodenal and pyloric; pyloric and non-pyloric; duodenal and non-pyloric.

We have selected of the many the following four cases to illustrate the value of blood-findings as interpreted by us in this paper for the differential diagnosis of the conditions discussed.

Case I.—A. L., male, aged thirty-eight years, plumber. Patient is ailing with indigestion and severe attacks of abdominal pain for the last fifteen years. Pain starts in the pit of the stomach and radiates to right and left lumbar regions. He wakens at night on account of pain. Pain comes on from two to four hours after meals. His pain is relieved immediately after ingestion of food. He has never vomited, nor has he noticed blood in his stools. Has never been constipated. Appetite good. Physical examination: great tenderness to right at navel, none in the appendicular region.

Gastric analysis on fasting stomach; marked microscopic stagnation on one examination, absence of stagnation on a second occasion.

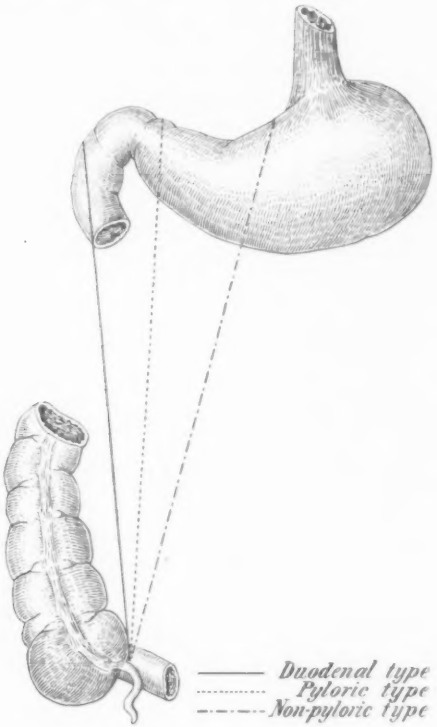
After test breakfast obtained 10 c.c. contents; hyperacidity. *X*-ray examination showed hypermotility of the intestines.

Patient gave a clear Moynihan's history; hunger, night pain, and late pain. Pylorospasm (intermittent stagnation), frequently found in duodenal ulcer, was present.

X-ray findings were also in favor of duodenal ulcer. Last, but not least, polycythemia was found (Case 2, Table VI).

Operation by Dr. Peck revealed a congested appendix and bands around. No ulcer in the duodenum nor in the stomach.

The blood-findings did not correspond to the duodenal type. They presented a combination of all the three types: polycythemia-duodenal type, relative eosinophilia (4 per cent.), pyloric, and leukocytosis, non-pyloric type.



CASE II.—K. H., aged twenty-five years, grocer, was seen first August 7, 1913 Patient complained for several years of attacks of spontaneous pain in the region of the left hypochondrium. Pain is at times sharp, at others gnawing. Lately pain comes on three to four hours after meals. He is always relieved from pain after ingestion of food. Never had pain at night. No vomiting. On several occasions he has noticed blood in his stools, and at one time he had an intestinal hemorrhage which lasted three days. Has been always nervous.

Physical Examination. Great tenderness in the region of left hypochondrium. Gastric analysis on fasting stomach; 20 c.c., bile-tinged. After test breakfast, 140 c.c. Volume of solids much larger than volume of fluids. Hyperchlorhydria. Urine negative. *X*-rays showed a residue of bismuth at the pylorus after six hours.

Blood (Case 13, Table VI) showed anemia and the presence of large mononuclears.

Patient was on Lenhardz diet two weeks and later under ulcer therapy. He improved considerably for a short time, but in October he began to vomit repeatedly and in November he again had a severe intestinal hemorrhage. His feces, examined several times, gave positive reactions with guaiac.

About one month later, after recovering from his hemorrhages, he was referred to Roosevelt Hospital for operation, with the diagnosis of gastric ulcer. The operation, which was performed by Dr. Peck, did not reveal any ulcer in the stomach nor in the duodenum.

The blood of this patient was examined a number of times. On one occasion only it showed 5,100,000 after he had vomited for about a week several times a day. The smears repeatedly showed the same picture; large mononuclears, absence of small mononuclears, and scanty eosinophilia.

A correct diagnosis could have been made in this case if the history and symptoms and signs had not been overestimated and blood-findings underestimated. The blood did not correspond to any of the chief types, but presented a mixed type; from pyloric anemia, absence of small mononuclears, and scanty eosinophiles, as in the cases of the non-pyloric and duodenal groups. Large mononuclears, one of the characteristics of appendicitis, were present in the blood.

Case III.—W. D., male, aged forty-three years, tailor, was seen first August 20, 1913. Five years ago patient began to have sharp, cutting pain in the right lumbar region, which radiated to the left of the abdomen, chest, and back. They usually lasted from one-half to two hours. The pain never came on at night or in late hours after ingestion of food. The pain was always relieved after meals. For the last two years the pain has become continuous. He vomited only twice since his present illness started. Never had hematemesis or melena. Appetite fair. Bowels regular.

Physical Examination. Corneal anesthesia. Loss of pharyngeal reflexes. Slight tenderness around right side. No muscular rigidity.

Gastric analysis: No stagnation of food. Mild hyperacidity.

Feces: No occult blood.

X-ray examination negative.

Operation (Dr. A. A. Berg) revealed a double ulcer (duodenal and gastric at lesser curvature) near cardia. It was difficult to induce the surgeon to operate upon the patient for duodenal

ulcer. Except hunger pain there was nothing to account for the diagnosis. However the blood-picture showed the full duodenal type with leukocytosis, which was present in all the cases of the non-pyloric group.

CASE IV.—S. M., aged forty-seven years; tinsmith; was first seen December 14, 1913. Until six weeks ago he was perfectly well. About that time he was suddenly seized with abdominal pain and constipation. The cramp-like pains came on every five minutes. Pain was not relieved after taking food. He has never vomited. Had bleeding piles. Has lost in flesh.

Physical Examination. Tenderness in the region of the colon descendens. No tenderness in the epigastric region, nor elsewhere in the abdomen. Digital, rectal, and proctoscopic examinations negative. The blood (Case 4, gastric ulcer, Table II), pointed to the non-pyloric type. The introduction of the stomach-tube was refused by the patient first and allowed later.

Gastric analysis showed stagnation of food and hyperacidity.

X-ray examination showed a bismuth residue after nine hours.

The history of the patient led one rather to suspect malignancy of the sigmoid; a sudden onset of attacks of abdominal pain, and constipation with localized tenderness in lower abdomen to the left in a man in the carcinomatous age.

Gastric analysis and *x*-ray findings pointed strongly to pyloric obstruction of non-malignant character.

The operation (performed by Dr. Peck) revealed an indurated ulcer at the lesser curvature two inches from the pylorus, which was found to be patent. It is evident that positiveness was obtained by the aid of blood-findings.

We have purposely refrained from the discussion of the diagnostic signs and symptoms hitherto known in these conditions. In our hospital and private practice we have of course followed them, but we never obtained such definite indications as we have since we have made careful studies of the blood such as are indicated above. Of course the history, the physical examination of the abdomen, the analysis of the gastric contents and of the feces, and finally the *x*-ray findings give valuable data; none of these, however, seem to stand in definite relation to the site and character of the lesion in the great majority of cases. The blood-findings, on the other hand, seem to possess such a relation, much as the changes in mentality, in muscular strength, and in reflexes, bear a definite and localizing significance in the diseases of the nervous system.

NOTE.—In Cases 17 and 18 (Tables III and IV), owing to our interpretations of blood-findings, the diagnosis of duodenal ulcer and appendicitis was correctly made and with these diagnoses the patients were referred to Dr. Peck for operation.

MYOPATHY: WITH CLINICAL RECORDS OF EIGHT CASES COMPRISING VARIOUS TYPES.

By Thomas J. Orbison, M.D.,

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The myopathies have been widely discussed of late years, both abroad and in America. Last year the study of this subject was stimulated by a paper by William G. Spiller,[1] which was laid before the Neuropathological Section of the International Congress. In it he discussed the relation of the myopathies and the classification of the various types.

The present paper contains clinical records of eight cases. There are no postmortem findings, as all the patients are alive. In one case (Case VI) there are biopsy findings which reinforce the diagnosis.

The results of a study of these cases only emphasize the meager benefits that may be claimed for any method of treatment that has been tried. The diagnosis in Case VIII is tentative. The condition being a rare one and the symptoms having recurred after a remission of five years, it must needs be guarded until further developments occur.

Cases I and II.—Atrophy combined with pseudomuscular hypertrophy. Referred to me by Dr. Charles L. King, of Pasadena.

Two brothers, G. C., aged eleven years, and J. C., aged nine years.

Family History.—Both parents are alive and healthy. There is no history of similar disease on either side of the family. There are four other children (three girls and one boy), all of whom are thus far normal; one boy is aged thirteen years, one girl fourteen years, one girl six years, and one girl three and one-half years.

Case I.—Corresponding to the Werdnig-Hoffmann type.

Previous History.—G. C., aged at present eleven years (seen first in 1911; last time in 1914). All during his intra-uterine life his mother's health was bad; she suffered with asthma and was given large doses of strychnin daily. He was born at term, but never could crawl. The first attempt at locomotion was standing by a chair and pushing it ahead of him. He did not walk alone until about two and one-third years of age. He had adenoids, which were removed. He was circumcised. As a baby he could never sit alone.

Present Condition (1911). He cannot walk or run like other boys, and is easily pushed over. His parents say that his condition

[1] Brain, vol. xxxvi, Part 1.

is progressing badly. While he has been under my care he developed pneumonia, from which he recovered.

FIG. 1.—Case I (*a*).

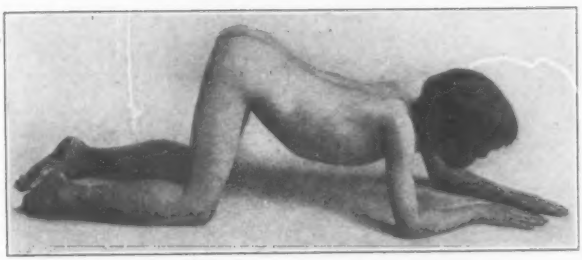


FIG. 2.—Case I (*b*).

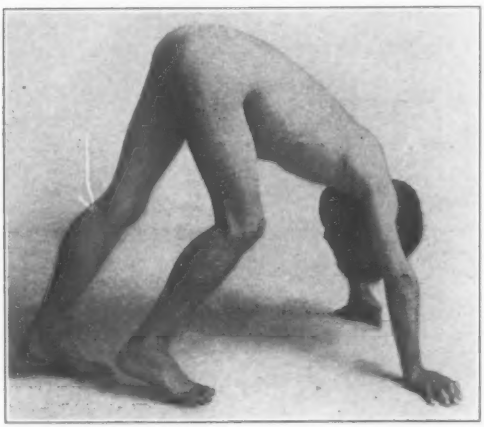


FIG. 3.—Case I (*c*).

Physical Examination. Gait is waddling. When he lies prone and attempts to arise he does so by means of a characteristic sequence of mechanical acts (see Case I, Figs. 1 to 5).

Lordosis is present to a noticeable degree. His superior maxillary and palatine arch are very high and his teeth present irregularly.

FIG. 4.—Case I (*d*).

FIG. 5.—Case I (*e*).

therefore his speech is affected and he lisps certain sounds. Also, his speech is processional. His scapulæ flare. When he is raised from the ground by means of hands placed in his axillæ the shoulders

are pushed as high as his ears before his feet begin to leave the ground.

He exhibits inability to flex the feet, difficulty in flexing either thigh, difficulty in raising erect from a stooping posture.

The calf muscles appear to be very much hypertrophied. They are large and hard, but lack strength (see photographs). Reflexes: knee-jerks absent.

During the three years he has been under observation his condition has not improved, but rather decidedly progressed. During that time the calf muscles have increased in circumference 4 cm., whereas the thighs have decreased 2 cm. The progress of his disease has left him almost helpless (1914).

Case I. Case II.

FIG. 6.—Note double foot-drop.

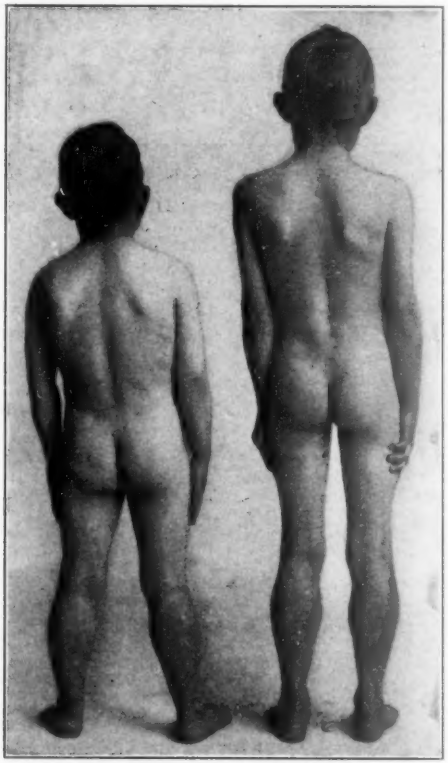
CASE II.—*Pseudomuscular hypertrophy of the Duchenne type of dystrophy.*

J. C., aged eight years (seen first in 1911; last time in 1914).

Previous History. He had three or four "spasms" while teething, but none since. While he was under my care he, with his similarly

afflicted brother, developed pneumonitis. It was considered quite a triumph to have them both recover. Almost their sole medication during this infection was quinin in suitable doses.

Present Condition. He cannot run quite like other children. It is especially difficult for him to ascend steps, except with assistance. His ability to play and get about is much better than his brother's, but his gait is waddling.



Case II. Case I.

FIG. 7.

Physical Examination. His general muscular development looks excellent (see photograph), but he stumbles easily and cannot flex his thighs effectively. He can flex his feet. When he arises from the prone position the act is accomplished much more easily by him than by his brother. Since he was first seen (1911) his condition has not progressed nearly so rapidly or to such a marked extent as his brother's.

CASE III.—*Infantile dystrophy.*

D. P., aged twenty-eight months, seen in my service at the Children's Hospital.

Family History. Father died of tuberculosis. Mother has had malaria, but is now in good health. No other members of the family are affected like the patient.

Previous History. She was born at full term and without instruments. Her health has been good. When she began to crawl she seemed strong and active, but it was noticed that she was stronger in the right leg than in the left. She did not walk until she was fifteen months old, and for a time she walked very well.

FIG. 8.—Case III.

Present History. For the last two months she has become weaker steadily. This shows itself especially in her locomotion.

Physical Examination. The child is apparently well nourished and her musculature looks above rather than below the normal. But, whereas the anterior portions of her thighs, for example, look large and strong, a firm grasp reveals in reality a soft, flabby struc-

ture. The calf muscles are similarly deceptive. The dorsal muscles are weak and the child stands in the position of lordosis. Her gait is a succession of weak efforts and she will fall unless assisted. The muscles of the arm and shoulder are quite strong. The joints of the ankles, knees, and wrists are extremely pliable. Reflexes: The knee-jerks are present but sluggish.

FIG. 9.—Case IV.

CASE IV.—*Myopathy coming on in adult life, remaining stationary after a period of progression.*

Mrs. H. W., aged thirty-eight years. Colored. Seen in my service at the Dispensary of the University of California, Los Angeles Medical Department.

Family History. Father is alive and healthy. Mother died of nephritis. They had seventeen children; of these nine lived. Eight died in early childhood (patient did not know if any of them exhibited symptoms of muscular dystrophy).

Previous History. Typhoid pneumonia at about eight years of age, otherwise she has been healthy. She says that she could run and jump much better than most girls. She has been married twice, but was never pregnant.[2]

[2] Suggesting luetic infection.

Present Condition. About seven years ago she noticed a beginning inability to run fast. Later she found that she could not go up stairs as easily as before. Sill later her back became weaker; she could not lean forward without taking hold of her own knees; she could not arise from a prone position or stoop to the floor without "climbing up her own legs."

Physical Examination. Pupils equal and react normally. Gait is waddling. Station is good. Reflexes: Knee-jerks sluggish; ankle-jerks absent. No Babinski. Sensation intact.

The leg muscles looked very strong, but she exhibited difficulty in flexing the thighs against pressure. There was marked lordosis (see photograph).

Since seeing her first the condition has not progressed and she thinks it has remained stationary for over a year.

CASE V.—*Progressive atrophy of the shoulder girdle, dorsal, thoracic, and thigh muscles, with true hypertrophy of the calf muscles.*

X, aged twenty-four years. Referred by Dr. A. S. Lobingier and seen in consultation with him and Dr. Harvey Cushing.

Family History. No evidence of a similar disease in his family.

Previous History. Has always been well except for the present trouble.

Present Condition. This began in early adult life and has steadily progressed until he is now unable to walk, except in the most grotesque and seemingly impossible manner, because of the extensive involvement of the lower dorsal and thigh muscles. There has been no pain or discomfort in the muscles themselves.

When he walks he cannot move forward in the direction in which he seems to be facing, but is forced to walk to his destination sidewise and with a succession of spasmodic movements of his legs which would be absolutely impossible for him, except that necessity has forced him to learn them because of the gradual loss of one set of muscles after another and their adoption has been a forced selection. His condition is truly pitiable and especially so as he has lately married. His only possible mode of getting about is by wheel chair. We strongly advised him against having children.

CASE VI.—*Progressive atrophy, beginning in the trapezius.*

W. M., aged twenty years; machinist. Referred to me by Dr. MacKerras, of Sierre Madre, California.

Family History. Both parents are alive and in good health.

Previous History. He had measles when a young child, otherwise his health has been exceptionally good. Five years ago he began to work in a machine shop and did not notice any abnormality up to two years ago. In his work he has carried heavy weights.

Present Condition. About two years ago he began to experience momentary spasm in the muscles of the right side of his neck, which at times were severe enough to draw his head to that side.

They would come on at irregular intervals, at times daily for many days. At present this will occur only occasionally and with long intervals between spasms. He began to notice that the right shoulder was lower than the left at about the same time that the spasms began. At present the spasms are very mild.

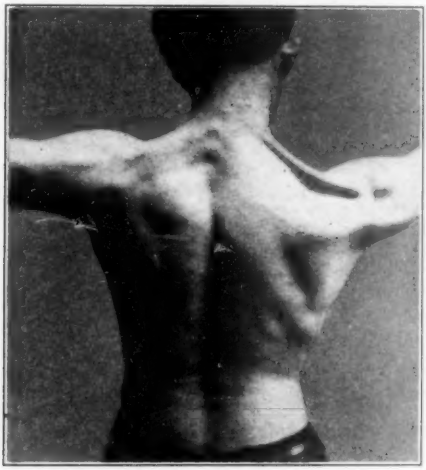


FIG. 10.—Case VI.

There has been no pain or tenderness in the affected muscles, but he has been conscious of a tired ache in them that has been fairly constant for some time. The wasting has been progressive and has not affected the strength of any other muscles than the trapezius and the clavicular branch of the sternocleidomastoid (the affected muscles) (see photograph, Case VI). The affected muscles feel putty-like under the fingers.

The treatment in this case was the application of the faradic current daily through a period of six weeks. The effect of this treatment was beneficial as far as the subjective symptoms of tiredness and aching were concerned. There was some real filling out of the scapular and adjoining muscles, upon which extra strain was placed because of the impotence of the trapezius.

A biopsy was performed; the portion of the trapezius examined showed the typical proliferation of nuclei in the muscle fibers, with disease of the muscle fibers and surrounding tissue.

CASE VII.—*Progressive neurotic muscular atrophy.*

J. S., aged fifty-six years. Referred to me by Dr. C. H. Lowell.

Family History. Both parents and all their eight children are gouty. None of them show a condition similar to the patient.

Previous History. Up to four months ago he was in good health. In July, 1913, he was in a serious railroad wreck, but did not exhibit any nervous symptoms for five months.

Present Condition. In November, 1913, his leg muscles began to become stiff, tender, and weak. He began with difficulty in flexing his thighs, as in ascending steps. Later he began to stumble, due to difficulty in flexing his feet. He stubs his toes frequently and almost falls. Once he caught his right toe back of his left ankle and nearly fell.

FIG. 11.—Case VII.

Lately his locomotion has been greatly interfered with because of intense fatiguability in the legs, almost identical with that of intermittent claudication. The right arm has begun to be affected, and he is now unable to raise his hand above his head or place it at the back of his neck. He cannot use his fingers as in the act of buttoning. When he walks he drags his right leg more than his left, though his left is very weak also. His weight has decreased rapidly.

Physical Examination. Pupils equal and react normally to light, and in accommodation. The tongue is protruded well but slightly to the right; it shows no tremors.

There is no tremor of the face. Lightning-like fibrillary tremors are noted in the arms, thorax, and legs. His grip is good in both hands, but relaxes soon.

Station is unsteady with eyes open or closed.

The thighs are wasted and the flexor muscles most affected. The feet cannot be forced beyond the walking angle.

FIG. 12.—Case VII.

The calf muscles are tense and contracted, and give the sensation of being hard and indurated to the palpating hand.

Reflexes exaggerated. Tapping over the muscles causes them to jerk.

When the patient lies prone and the left leg raised, he experiences sudden cramp-like pain in the deep flexors of the upper thigh.

This case seems to correspond to the neurotic type of progressive muscular atrophy as described by J. Hoffman in *Die Deutsche Klinik*.

CASE VIII.—*Myasthenia, especially of extra-ocular muscles.*

R. P. S., aged thirty-two years; married. Referred to me by Dr. Lewis Thorpe.

Family History. His father died when the patient was six months old, after an operation for cancer. His mother is alive and healthy. No other members of the family are afflicted as he is.

Previous History. He has always been healthy and athletic, except that five years ago he had a right hyperphoria lasting five months. At that time he was under the care of Dr. Lewis Thorpe, an oculist. After a trip to the mountains this condition seemed to disappear. There were no accompanying symptoms.

In May, 1913, he was infected with gonorrhea and was discharged cured in six months (see below).

In August, 1913, he began to notice a disturbance of vision when he looked to the left. This was a temporary diplopia. In December following he noticed that in addition to this the left eyelid would droop and the left eye-ball showed a tendency to look downward and outward; this came on within forty-eight hours. Both eyes were more or less similarly affected, but the left one more than the right. He then went on a two months' trip, as he had become very weak and nervous. For a time he experienced various sensory disturbances, for example, numbness and stiffness in the face, head, arms, and legs. There was no headache, nausea, or vomiting, nor has there been at any time since.

In February, 1914, the disturbance of vision became worse, due to progressive weakness in the extra-ocular muscles, especially the right external rectus, both internal recti, both superior recti, and left levatory palpebræ superioris. The right levator palpebræ superioris was affected, but to a lesser degree. His symptoms are decidedly aggravated after any excitement.

In addition to the myasthenic condition of the extra-ocular muscles he complains of fatiguability that is more or less general. This does not show itself in any speech disturbance or marked weakness in any one set of muscles, and it is not constant, although he never feels the normal capacity.

Physcal Examination. Pupils are equal and react to light and in accommodation; convergence is impossible for him. When asked to fix a line he will see one end of it bent downward. Continuing to fix it will result in the ability to do so. He can overcome the diplopia by an effort. The excursions of the eyes vary at different times. The excursion of the eyes in conjugate movements is not the same (for each eye) as when they are tested separately. For example, when both eyes are moved together the unequal pull on the muscles is not apparent; when they look to the left the external rectus does not pull the left eye outward to the same extent as when the left eye is abducted alone, and as it would do if the nerve to the left internal muscles was paralyzed. Similar differences are noted in other movements. This point was considered to be of sufficient diagnostic importance to help rule out nuclear and neural involvement and to enable one to locate the disease in the muscles. The picture is a different one from ophthalmoplegia externa due to syphilis or neoplasm.

Ptosis is noted on both sides but more pronounced on the left. The extent of ptosis on both sides varies from time to time and at times is scarcely noticeable.

Although he complained of fugacious feelings of stiffness and numbness in the face it was not possible to discover any disturbance of function in the distribution of the facial or trigeminus on either side. Station and gait are good. Reflexes: biceps, knee, and Achilles-jerks are somewhat exaggerated. There is no Babinski.

Heart and lungs are normal. Blood-pressure is 125 systolic.

The eye examination (by Dr. Lewis Thorpe) showed normal fundi.

An instructive feature of the examination of the color fields is that the first two examinations showed some interlacing and did not conform to each other. The third one was normal. The reason for this was that he was overanxious to obey instructions, and, until this was discovered and corrected, he gave faulty answers.

Repeated examinations seem to be essential.

Laboratory examinations (by Drs. Brem and Zeiler): Wassermann (blood and spinal fluid) negative. Von Pirquet skin test for tubercle bacilli negative. Noguchi luetin test negative. Complement-fixation test for gonorrhea positive.

In this connection it is to be remembered that his first myasthenic attack was nearly five years previous to the gonorrheal infection. Whether the presence of a toxic focus that is surely active is sufficient to have a determining effect upon the recurrence of the myasthenia remains to be seen. Neoplasms, nuclear disease, and the various forms of encephalitis and meningo-encephalitis seem to have been eliminated. The same is true of tuberculosis and syphilis of the central nervous system. Therefore a tentative diagnosis was made of myasthenia of the extra-ocular muscles with a less-marked general involvement. Myasthenia gravis pseudo-paralytica may be the final diagnosis. The dominant symptom is the ready fatiguability of the extra-occular musculature. The condition is progressing unfavorably.

The treatment in this case is the exhibition of thymus gland, strychnin, and electricity.

Summary. Case IV is the only instance known to the writer of myopathy in a colored person. In this case there has been an arrest of the condition for over a year.

The electrical reactions in every case were a very much delayed response to the faradic interrupted current in the affected muscles.

Two of these cases were brothers, but in no other case was the familial element present. In none of them was there a history of heredity. The exhibition of electricity was distinctly beneficial in at least one case (Case VI).

Little or nothing that was elicited in these cases could be considered in the light of an etiological factor except muscle strain in Case VI and general exposure in Case VII.

THE USE OF PITUITARY EXTRACT IN THE CONTROL OF SOME OF THE ASSOCIATED SYMPTOMS OF PNEUMONIA WHICH FAVOR HYPOTENSION.

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The emphasis in the therapeutic use of pituitery extract in pneumonia has, thus far, been chiefly laid on its marked stimulating effect on the circulation and in the enthusiasm engendered by this discovery, other effects favorable in certain emergencies of pneumonia have been overlooked or remained unmentioned.

With our present knowledge as to the significance of the blood-pressure in pneumonia every factor bearing on this phase of the question deserves close attention. While it is true that all depression of blood-pressure in pneumonia can be traced to the effect of the pneumonic toxin directly or indirectly on the circulation, yet much can be gained from an analysis of the way in which various factors affecting the course of the disease in this way act. As examples of factors acting unfavorably in a general way, lack of fresh air, improper or insufficient nourishment, excessive cough, pain, loss of sleep, etc., may be mentioned. Without minimizing the importance of such factors, should, however, factors present themselves which in addition to their general capacity for harm manifest a specific action on the circulation, our interest should be doubly aroused. It is to two such conditions at times associated with pneumonia, tympanitic distention and diarrhea, that we desire to call attention.

Tympanitic distention presents a comparatively simple problem. The circulation is hampered in a twofold way. The diaphragm is forced upward so that not only does the capacity of the chest at rest suffer, but its active capacity is curtailed through inability of the diaphragm to descend freely on inspiration. This results in impaired oxygenation of the blood, a lack which is magnified by the added demands of the increased effort in breathing. The heart, in turn, nourished by this oxygen-poor blood, is less able to perform its task and is further hindered by the crowding and change of position to which it is subjected.

The cause of the distention is a more or less complete paresis of the intestine, toxic in origin, and directly dependent on the pneumonic poison. How remedy this state of affairs? The course which suggests itself—reduce the dose of poison by elimination—cannot practically be followed as a first step. The reason for this is obvious, the organs to which we must turn, the lungs, the skin, the bowels, and the kidneys, are already seriously handicapped or their use contra-indicated. In the lungs hampered, as described

above, the futility of hasty respiratory stimulation is apparent. The skin offers no hope of assistance, as relaxed and sweating states must be avoided. The bowel, the seat of the trouble, we presume would not present this condition had efforts already directed to its support have availed. The kidneys, dependent as they are on some degree of circulatory efficiency, must be discounted as our circulation is throttled by the very symptom we are trying to relieve. Thus it seems that a blank wall is met, and it is for this reason that we justly view with alarm the syndrome of weakened heart sounds, rapid, compressible pulse, drooping pressure, dyspnea, restlessness, scanty urine, constipation, and gas-distended bowel.

The relief of the tympanitic distention, all will agree, is here the thing above all to be sought. Rather relieve the distressing symptom by measures directed specially toward it than to practice a still further stimulation of a collapsing circulation. When the condition is marked it is too late to invoke diet; it is too late to lessen toxicity. These questions should have been to such an extent under the physician's care prior to the onset of this symptom, that little were left to be done in this respect. The hope of successful emergence from the dilemma depends upon the extent to which direct measures to the relief of this tympanites have been exhausted. It is not our purpose to speak of the use of carminatives by mouth and by rectum, supplemented by the rectal tube, local applications to the abdomen, and the hypodermic use of strychnin, eserin, etc., but rather of a single, newer therapeutic agent which in our experience will accomplish the desired result when our other most trusted measures have failed. We refer to the extract of the posterior lobe of the pituitary body. This as obtainable under the trade names of pituitrin, hypophysin, etc., ready for hypodermic use, offers no technical difficulties in its administration.

Its stimulating effect on the intestinal muscle,[1] a property too often overlooked, is now called upon. There is nothing bizarre in this action, the unstriped muscle of the intestine is simply sharing this effect in common with such involuntary muscle as that of the uterus and arterioles. The dose of 1 c.c. can be given subcutaneously and repeated at one, two, three, or more hour intervals as the need arises. In the graver cases more is to be feared from a persistence of distressing symptoms than from untoward effects from an overdose. The preparation has been shown to be nontoxic, and should conditions be such that it can do no good it should certainly do no harm. When administered in sufficient dose the effect is indeed gratifying. Where no passage of gas is obtained before its use, such passage often soon takes place, even at times to the extent of loud and repeated flatus. The general circulation

[1] Bell and Hicks, British Med. Jour., March 27, 1909; T. W. Harvey, Med. Rec., March 21, 1914.

benefits not only from this release, but is itself independently stimulated and toned up. Indeed, one must not lose sight of the fact that this circulatory awakening may have carried such previously administered remedies as eserin and strychnin to their goal and so added their beneficial though tardy effect. The mental as well as the physical condition of the patient quickly responds, and the picture from one of despair and exhaustion is turned to one of hope and comfort.

Needless to say, elimination by the bowels, kidneys, and lungs is reëstablished in a favorable case and the underlying cause of the trouble is relieved, even though it be secondarily. It is fair to assume that no procedure, had it not attacked the intestinal relaxation with equal vigor, would have prevailed. The greater effect on the intestinal musculature, in the presence of tympanites, of this substance than that obtainable from any other agent is paralleled by its similar greater action on the arterioles and uterus. In all these instances its effect seems to be the most beneficient when the need is the greatest. The diuretic action of pituitary extract should be mentioned in passing. Its bearing on the problem of elimination is of course apparent.

Diarrhea in pneumonia presents another condition in which in addition to its general exhausting effect on the system it singles out the circulation and lowers blood-pressure by the extraction of fluid from the circulating blood. The problem differs from that in the case of tympanites in that up to a certain point the diarrhea may be considered as advantageous in the exercise of the eliminative function of the bowel.

It must be decided first, therefore, before thought is given to therapeusis, whether the diarrhea is increasing or decreasing the patient's chance of recovery. Our chief guide here, as in the other emergencies of pneumonia, must be a study of the state of the circulation. When it can be shown that the vigor of the circulation is lessening it would seem by far safer to assume that any advantage accruing from the continuance of diarrhea will be more than overbalanced by the harm it may work. In such case it should be controlled, but by this is not meant a near stoppage of elimination by this route. Provision should be made for adequate but not excessive bowel movement.

For years clinicians have realized the value of the bowel as an aid to elimination in pneumonia, but while advising of its use have cautioned against its abuse. The present discussion does not presume to add anything to this advice, but simply hopes to make its application more simple by correlating the blood-pressure phenomena and elimination by bowel in such a way that an instrument of precision may be brought to the aid of our only too often inadequate, clinical sense.

The diarrhea may be a true eliminative one and thus compensa-

tory to the action of the kidneys. It may be irritative as the result of bacterial and other changes consequent on the perverted alimentary function at such a time or due to improper feeding or medication. It may also be a true relaxing diarrhea associated with a general systemic depression.

In the first instance it may be distinctly helpful; in the last decidedly harmful, and in the intermediate instance either helpful or harmful, depending on whether the gain to the system in ridding itself of noxious material is not counterbalanced by an excessive fluid loss.

While it can be stated that any marked diarrhea will lower the blood-pressure it cannot likewise be stated that such fall will invariably work harm to the patient. This is specially true during the early hours of the disease when congestive phenomena are present and a general plethoric condition exists. At such a time free catharsis may take the place of the less safe use of such depressants as veratrum viride or aconite.

As illustrative of this fact the case comes to mind of a stout, middle-aged man recently seen who early in the course of pneumonia showed flushed face, overfilled vessels, rapid, bounding, and occasionally irregular pulse, moderate dyspnea with a systolic pressure of 180 mm., and a diastolic pressure of 110 mm. A course of calomel, followed by free saline catharsis, resulted in a fall in systolic pressure of 20 mm. and in diastolic pressure of 25. mm., together with other evidences of improved circulatory conditions. This fall must not be considered a fall from but a fall to normal for this individual. Later also if the blood has accumulated in the venous side of the circulation and the right heart is laboring and blood-letting is indicated free catharsis in the absence of this salutary measure would seem to be indicated. In this event what the circulation calls for is depletion.

When the primary excitation is passed and the toxins of the disease are about to manifest their depressant effect the presence of diarrhea must be watched with distrust. The circulation having subsided from its first reaction to the invasion, the normal (for the particular individual) systolic, disastolic, and pulse pressures should be ascertained and then watched.[2] The pulse blood-pressure ratio should be followed and changes in the ausculatory sequences observed.[3] Should an undue looseness of the bowels then exist in the presence of sphygmomanometric evidence, than which there is none earlier of lessening circulatory efficiency, this condition should be brought under control.

Again it is not our purpose to consider the usual means to this end. In connection, however, with what has been said of the

[2] Nicholson, AMER. JOUR. MED. SCI., April, 1914.
[3] A. A. Howell, Jour. Amer. Med. Assoc., April 18, 1914.

action of pituitary extract on the intestine it is an interesting question to decide whether or not its administration is contra-indicated by the presence of diarrhea. I feel that it is not. While it has undoubtedly a stimulating action on the intestine, this will not unduly manifest itself in the face of an already existing motor excitation. Nor does its introduction into the system entail a further pouring of fluid into the intestine; quite the reverse should be the case, through the improvement of vascular and general tone. The exhibition then of pituitary extract, if it is indicated for circulatory reasons, is not contra-indicated by the presence of diarrhea. When a satisfactory bowel condition has been reëstablished special care should be exercised in the nourishment of the patient and provision made for as free elimination as possible through the kidneys.

It is not essential to the value of the action of pituitary extract whether it be considered as a true internal secretion or not. Suffice it to say that in the posterior lobe of the pituitary body an adrenalin-like principle is contained which, due to its special organic structure, produces and maintains rises in blood-pressure better than does adrenalin, and therefore is more reliable in conditions of circulatory collapse than is adrenalin. Also in addition to this action its selective action on involuntary muscle as a whole should not be overlooked, and more especially in the present connection its stimulating action on the intestinal musculature.

THE TRAUMATIC NEUROSIS.

By Dr. Tom A. Williams, M.B., C.M. (Edin.),

corresponding member, societies of neurology and psychology, paris, etc.; neurologist to epiphany dispensary, washington, d. c.

Physiological Fundamentals. Traumatic neurosis is a complete misnomer; the condition is psychogenetic, therefore it is not neural; and the trauma is not physical. An injury in itself cannot cause a "neurosis," meaning a psychosis. This condition occurs only when the patient broods over the injury and imagines that he is a very sick person. To represent to oneself feelingly a disease is to make oneself feel very sick, even although the disease one conceives may not itself be manifested with verisimilitude. The patient then, having the idea that he is sick, acts so and feels so; so that after a while he actually is sick.

This is on account of the fact that the idea of pain is capable of arousing the concomitants of pain, namely, depression of vegetative functions. This occurs because of the emotional reactions

inseparable from the concepts which experience has associated with them. The situation is merely that of the dog in which Pawlow, during his experiments, suppressed the flow of gastric juice by merely showing a whip. It is a "conditioning" of a reflex, and is feasible with any dog.

This fact makes manifest how erroneous is the common opinion that the "conditioning" of affective reactions in a morbid fashion requires previous morbidity for its accomplishment. This is usually stated in the formula that traumatic neurosis occurs only in the predisposed. The real factor in its induction is the momentum of the conditioning stimulus. A homely illustration is that used by the penetrating dramatist Augustus Thomas, in *The Harvest Moon*, where he makes a hard-headed lawyer, against his will, the victim of the suggestion that he is dangerously ill.

Of course it should be obvious that the patient, although a victim of imagination, may become really ill physically; just as it is obvious that Pawlow's dog, a mere victim of imagination, is ill therewith to the extent of an incapacity to secrete gastric juice, which means very ill indeed. Indeed, psychogenetic physical illness of this kind may reach such a degree as to cause death, as has been experimentally shown by Crile and others.

Furthermore, if the reactions have gone too far the removal of the cause will not save the life of the animal. Short of death, secondary organic changes may occur, so that recovery will be incomplete.

But even when the stimuli are insufficient to produce organic changes the cure of the subject demands more than a mere material removal of them, for the stimuli live in memory, where they have become associated with many elements of the environment; so that the cause is not really removed until a complete reconditioning is effected of all the associational reactions which have gathered around the initial dread-bringing circumstance.

For instance a tachycardia produced by fear, if long continued, should not be less injurious to the heart and bloodvessels than is excessive athletics; an outpouring of an excess of substances from the adrenals should just as likely produce vessel sclerosis or exhaust the gland when it is the result of chronic anxiety as when it is due to a physiological stimulus of more direct kind; a dyspepsia or chronic constipation is just as likely to lead to malnutrition and toxemia when it is the result of mental depression as when it is due to sluggish habits or some disease.

The mechanism by which the modification of reaction occurs is usually that of suggestion. The dog which secretes gastric juice when it hears a bell does so because of the suggestion that meat will be presented him forthwith. It does not know why a bell brings meat; it mistakes it for a reaction of cause and effect, like that of a wetting when it enters the water. The process is not one of

genuine reasoning. The person who is hypochondriacal after an accident has as little reason in calling accident cause and neurosis effect as has the dog in believing bell cause and meat effect. It is belief without proper ratiocination, received blindly, credulously, from someone else without criticism; that is, by suggestion. This is, unfortunately, the commonest method by which opinions are acquired by human beings. Indeed the vast majority acquire their beliefs in no other way; and only a few scientists and still fewer superior minds have eliminated this manner of appraising the facts they encounter. It is small wonder then that the conditioning of reactions becomes morbid so easily, for we find morbidity all around. It is often dramatically impressive and frequently comes home to us by association with the deepest affections. Hysteria, then, which is merely the "effects of suggestions when these cause disease," is necessarily very widespread, and the circumstances that give rise to it and the forms that it takes are proportional to their impressiveness, which means suggestive power, and in accordance with fashion and the *zeitgeist* of the country and time.

The mechanism is always the same, and the victim is not aware of the systems of ideas and associated affects which constitute his psychosis.

The Induction of Suggestion Psychoses. The Emotional Consequences. Cases and Discussions. In the gross these are most clearly manifest in what our attitude of detachment easily enables us to label the superstitions of alien peoples. Thus the sufferings induced by the "gnawing fox" of the Japanese are made possible only by a deeply rooted belief in its existence. For example, a woman after labor declared she felt the "fox coming," this was her interpretation of the after-pains she felt. The great parade by the neighbors in attempting to prevent the fox's attack only reinforced the patient's apprehension, and soon a horrible convulsion signalized her seizure by the fox. Terror and convulsions held her until the exorciser was called. He declared that the fox would leave her at four o'oclock the next day provided certain offerings were placed on a certain tomb for it to eat. This simple suggestion caused her to dismiss her terror suddenly at the hour designated. The crudeness of the mechanism in the case of this ignorant peasant need not make us smile, for our Western case is very little better, as the following illustration shows:

It is the familiar case of an incapacitated railroad employee to whom we were called to determine whether or not there was organic disease of the nervous system. The fact that there was not is shown elsewhere in the full report of the case. The psychogenesis of the man's condition was evident in his fixed idea, due to the common belief of railroad employees that serious nervous disease may slowly ensue upon an accident. This common belief was strengthened by the injudicious sympathy and inquiries of his friends and the

doubtful prognosis of some medical men he had consulted. He "answered a thousand questions a day," he "did not know what to think about his health," and worried about his condition and circumstances; he was "too much preoccupied with his health even to miss his wife;" he had lost weight and appetite, had a sore throat, and wept much; and finally his attitude was strengthened by lawyers who sought redress for him. He was cured within a month as a result of one interview, during which he was instructed in the role of ideas over bodily activity and the effects of worry and anxiety upon nutrition. In the certificate it was stated "there is and has been no disease of the spinal cord or peripheral nerves at play in the induction of any of the symptoms which I find. The erroneous belief that there has been such an injury powerfully contributes to the anxiety which maintains his present state."

The role of the idea of shock in perturbing this man's emotional life is strictly comparable with that of the gnawing fox of the Japanese folklore. In both cases too there was the period of reflection and incubation of the morbid notion, a familiar feature of such cases which has been insisted upon by Souques. It is rare that the symptoms ensue until after a time of meditation, during which the complex is systemitized.

The cure was not so simple as that of the Japanese exorcist. But it was a definite one, for the railroad breakman was taught to understand the mechanism of his affection and thus to overcome any future harm from the credulity in which he had grown up.[1] The Japanese woman, on the other hand, remained liable to another attack, as her belief in the fox was only reinforced by the manner of its removal.

A contrasting case where therapeutics failed will further push the lesson home. A government employee was injured by a falling case and remained barely able to walk even after his bruises of head and shoulder had healed. Called in consultation we explained the mechanism of his present incapacity and directed how to remove it. His family physician's acquiescence to our directions was only formal, as his bent was not psychological enough to grasp the principles at work. The fearful solicitude of the man's wife had constantly reinforced his timidity, so that in spite of a considerable temporary improvement he did not progress to full recovery. He remained lacrymose, depressed, and relatively incapable on account of the persistence of his false belief about his health and power.

Loss of "Nerve" after an Accident. Again, a railroad freight conductor was sent to me for care from North Carolina by the Southern Railway Company. He had fallen off a train and had been much shaken and bruised. Unlike most persons in such case he did not complain of pain or paralysis, but merely [illegible]

[1] His [illegible] work well.

what was truth, that he "could not sleep, and remained in a state of nervous agitation which would even cause him to cry at times and made life unbearable, from incapacity, weakness, and mental depression, so that he felt utterly unable to return to work, feeling that he could not perform it." In his happy domesticity there were no extrinsic psychological factors except the mental habitus of hyperconscientiousness of ambitious type. There was an entire absence of roughness often seen in men of that occupation. In its essence the situation was that the man felt unable to, and did not want to, lead again the arduous life of a railroad man, for which he was in reality temperamentally unsuited.

But even in this case adaptation to the unpleasant environment might have been accomplished had not the pernicious influence of the struggle for indemnification preponderated so as to interfere with psychological reconstruction. Instances of this kind are numerous. Isolated examples spring to the mind of every railroad surgeon; but an extensive comparison between cases equal in value to a deliberate experiment is best afforded by the observation of a train wreck in which 200 passengers were injured, about half of them severely. Only about 20 of these passengers developed traumatic neurosis. Some of these received heavy damages, upon which their health was immediately restored. In one case, however, a cure was effected by Dr. Bevan, the observer, without recourse to a lawsuit; but even this was done against the active protestations of the patient and only by extraordinary perseverance and determination on the part of the physician, whose method of persuasion was so insistent as to make the patient weep.

Compensation Not Curative. But it is not always that the indemnity effects the cure. There is a case well known in Washington where $17,000 was allowed by the court to a man in whom a street-car accident induced the belief that he was incapable of locomotion. This lasted for seven years, during which the patient went about in a wheel-chair administered by a solicitous wife. His wife's belief that he could not walk was rudely disturbed after the plaster had fallen from the roof while they were asleep in bed one night, when she found her husband seated in the corner of the room twelve feet from the head of the bed. She argued that if he could walk while asleep at night he could walk while awake by day. This he did in trembling fear after insistent persuasion by her, and eventually recovered in a few days.

It would be idle to pretend that these were deliberate simulators for gain. They were honest pretenders, just so much as is any person hysterical the victim of a suggestion that he is incapacitated. These cases must be carefully differentiated from those who consciously imitate symptoms in the hope of gain, even although the gain be merely the sympathy, attention, or notoriety from other people. The first type we call malingerers, the second are the

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[1] Five years later the man continues at work, well.

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maniacs, fantasticals, or pathological liars; neither of these types has immunity from the psychological reaction of suggestibility, which may eventuate in the genuine medical hysteria.

The initiator of symptoms may, of course, be an actual accident or disease; and equally so it may be derived from the mere idea of injury or of disease, so that the clinical problem to be analyzed may be exceedingly complex. Besides this the patient may refuse access to his psychological ground work, perhaps merely on account of shyness or shame of thoughts concerning which he fears misunderstanding or ridicule, and entirely apart from any question of venality. This phenomenon is found very commonly in psychoanalytic work, and it is the shame-faced reticences of patients which have led to the need of the use by some analysis of mechanistic expedients, such as the association-experiment (Jung), the dream unravelling, and the free-flow association.

These genuine psychoneurotics are entirely curable, quite apart from any question of indemnity in itself; but the struggle for indemnity cannot be given up without loss of self-respect in the implied confession of dishonesty or at least of the gross error of psychological interpretation concerning the role of the accident itself as the provoker of the illness; so that there is a preoccupying search by the patient for facts to ratify his belief that the accident had damaged him. This inevitably leads to imaginations, exaggerations, and falsifications inevitable for a mind not scientifically trained. It is only when the patient has a glimmering of his mistake that he begins in desperation to defend it by conscious self-deception in order to bolster up a psychosocial attitude the negation of which would, he believes, be derogatory.

The construction of this state of mind is thus described in my article before the 1913 International Congress of Medicine:

"Especially prone to this damaging sequence are persons whose imagination has been made rampant by the cultivation of the credulous fears of childhood; their fear-reaction to that which they do not understand is a dominant one, and they are easily beset by an idea linked with fear. The commonest of the fears which result from accident or injury is that of bodily harm. It is difficult for a person of this type, when ignorant of his own structure and functions, to shake off the foreboding created by an impressive catastrophe; and it must not be forgotten that what others regard as trifling the victim may look upon as catastrophic, judged by its possible effect on him. Prepossession by the idea of one's own disability is an inevitable consequence. This leads to abstraction from and inattention to the affairs of ordinary life, which, if not trifling by comparison in the patient's mind at least cannot claim the attention properly needed. Hence ensues the well-known diminution of the capacity to think, work, or take part in social life. This incapacity, when the patient becomes aware of it, leads

him to still further accentuate the result of his injury and thus to augment his alarm about his health. Thus is constituted the vicious circle of hypochondria. Even a nosophobia may ensue, such as the fear of lost manhood, insanity, paralysis. Alarm at this impending disaster must, of course, be distinguished from the primary alarm due to the accident itself."

FORENSIC PRESENTABILITY. This mechanism is so simple that it can clearly be grasped by any intelligent person even without medical training; it has been very convincingly popularized by Mr. Addington Bruce in the *Outlook* of May 9, 1914. There should be no difficulty, then, in convincing a court of the nature of these cases and of their curability when properly dealt with, and this should lead to an equitable appraisement for damages for loss of time and distress of mind. That this is not at present the case we believe to be due to the want of knowledge of many expert witnesses concerning the whole subject of the psychoneuroses. The point of view here set forth is entirely foreign to a mind of which the habit has been to be content with the farrago of confusions which was all that the older text-books afforded concerning functional nervous affections. Besides this, the appraisement of the functional nervous affection is inextricably interwoven with the whole subject of neurological diagnosis. A physician who is not thoroughly conversant with modern neurology is sure to give the jury a false impression of the status of his case unless he strictly confines himself to concrete facts observed by himself and leaves their interpretation to the neurological expert who follows him. In the conduct of such cases counsel should entirely discard the antiquated and misleading accounts in text-books of medicine and neurology; the issue should be presented solely by concrete facts elicited from the patient himself as observed by medical men and others, and the interpretation of these aside from all technical concepts in the plane of simple good sense, which means good psychology. A striking instance of this error has just transpired in the District of Columbia, where a case carefully outlined on this basis was thrown into confusion by the introduction of a general practitioner who, without adequate knowledge, took it upon himself to instruct the jury concerning neurological and psychopathological interpretations of which his hazy knowledge was only second-hand.

It was the case of a woman who after a trifling glass cut and a knock on the elbow gradually developed a complete flaccid paralysis of the right arm. The allegation of neuritis was easily disproved; the joints were not diseased; the spinal cord was intact, and the brain centre was not damaged. These were shown by complete mobility, absence of wasting, presence of the reflexes without exaggeration or spasticity. The psychogenetic nature of the paralysis was very clear, and the patient's own physician fully admitted this in the witness-box, and also that such paralyses often occurred without trauma of the body at all. Facts of this kind

are really not difficult to demonstrate to a jury if a properly trained psychopathologist is employed.

This was demonstrated very clearly in the case of Hill v. Chicago, Milwaukee & St. Paul Railroad, at Redwing, Minnesota, December, 1911. Here the psychogenetic nature of an affection which simulated lameness alleged to be due to sacrao-iliac and lumbar injury was so clearly shown the jury that instead of $15,000 damages demanded the allowance given was merely $1,500 for loss of time and stress of mind. This was a particularly "dangerous" case from the forensic aspect; but the railroad had become weary of paying indemnities for psychological accidents, and made this test case. The crucial point depended upon a demonstration by the neurologist that the attitude and movements of the patient did not conform to a syndrome which should have been present had the injury been where believed. This, along with the integrity of the reflexes and lack of wasting, convinced the jury that no lesion was present.

In conclusion, let me emphasize the importance of the fact that functional nervous syndromes which occur after accidents differ in no way from those found in persons who have been subjected to no accident at all. The accident then was a red herring across the trail of the real cause of the psychoneurosis. These doctrines have already been elaborated by me with numerous illustrations.

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GRANULOMA FUNGOIDES.[1]

By Michael G. Wohl, M.D.,

ASSOCIATE PROFESSOR OF PATHOLOGY AND BACTERIOLOGY, MEDICAL SCHOOL OF TEMPLE UNIVERSITY.

(From the Pathological Laboratory of the Samaritan Hospital.)

This condition, first described by Alibert in 1834, is a cutaneous disease which since then has been the object of investigation by many authors. Nevertheless, the origin of the disease still remains obscure.

[1] Presented before the Pathological Society of Philadelphia, April 9, 1914.

An instance of this condition came under my study at the Samaritan Hospital. The case was kindly referred for my pathological study by Dr. Edward B. Finck, to whom I wish to express my thanks. The history of the case is as follows:

J. T., male, aged thirty-four years; white; born in the United States; occupation, steam-fitter.

Family History. The family history is negative so far as his present condition is concerned.

Personal History. He was perfectly well until twelve years ago, when he noticed the appearance of a rash, first on the trunk, and then it spread to other parts of the body. Itching was intolerable. He was under the care of various physicians without getting much relief. A year ago a few small tumors developed. About seven months ago a few large tumors appeared, involving chiefly the shoulders, trunk, and neck. At this time he came under the observation of Dr. Finck.

On examination we find the tumors situated upon the shoulders, neck, and trunk. In between these tumors there are large areas of scaly eczematoid appearance, diffuse, and intensely itching. The tumors number from twenty to thirty, and vary in size. Some are as large as a pea, others attain the size of a large tomato, especially those which are situated upon shoulders and neck. The color of most of the tumors is bright red and some are of a dull-red color. On palpation, fluctuation is present in the greater proportion of the tumors. The lymph glands at the time of examination are not enlarged; however, the patient said upon questioning that the inguinal glands became large at times and then returned to normal size. Several of the tumors show slight ulcerations. The patient was transferred to the Polyclinic Hospital.

The blood examination was as follows:

Wassermann reaction negative: Red-blood cells, 4,960,000; white-blood cells, 20,200; hemoglobin, 62+. Differential count: small lymphocytes, 15; large lymphocytes, 4; transitionals, 2; polymorphonuclears, 81; basophiles, 0; eosinophiles, 0; color index, 0.63.

A nodule was excised from the left hypochondriac region, fixed in formalin, and embedded in colloidin. Section stained with hematoxylin and eosin, polychrome methylene blue, Mallory anilin blue, Giemsa's; a piece of tissue was likewise treated by Levaditi's method. The pathological report is as follows:

The tumor is ovoid, somewhat roundish; long diameter, 3 cm., transverse diameter, 2 cm., and of a semisolid consistency. The capsule of the tumor is somewhat thick and firm.

The microscopic picture is as follows:

In places where the infiltration is slight the papillæ are well preserved; in other areas where the infiltration is dense the papillæ are thinned and flattened out. In some places there seems to be

an infiltration with small round cells which occupy preformed spaces between the Malpighian layer and stratum lucidum. The subepithelial connective tissue seems to be masked by dense infiltrations of cells which vary greatly in their morphology. However, the bulk of the infiltrated areas is made up of small round cells poor in protoplasm; their nuclei stain intensely with the basic stains and resemble lymphocytes. Besides these small round cells there are scattered throughout the corium somewhat ovoid cells larger than the round cells; they are pale, vesicular, and show many mitotic figures. Several giant cells are also observed. The collections of cells are surrounded by loose connective tissue. In some

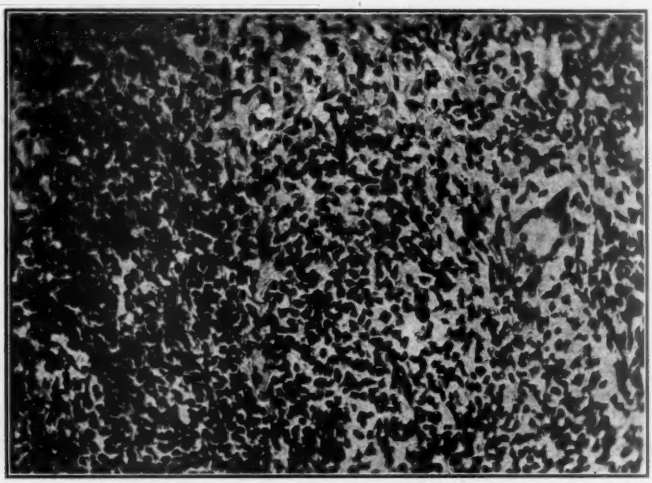

FIG. 1.—Microscopic picture of the specimen of our case. 1, note the dense cellular infiltration; 2, great variety of cells; 3, giant cell.

places the connective tissue is undergoing degeneration. Imperfectly developed capillaries are present. The majority of the capillaries are filled with round cells. Sweat glands are encircled by dense accumulations of the small round cells. The epithelial lining is undergoing proliferation.

Although Rindfleisch, Auspitz, Hammer, Vidal, and others have described microörganisms in the lymphoid tissue of cases of granuloma fungoides, yet the germ cultivated and inoculated into rabbits from a similar condition by Lassar and Doenitz did not provoke the pathological lesions characterizing granuloma fungoides. In our case the appearance of what would suggest some micrococci represents probably granules of broken-down cells. It remains for the future to determine the definite etiological factor. Yet there are some points collected from the literature which seem to have an etiological bearing upon the disease. Thus it seems to

have occurred not more than once in a family. In our case the family history is negative. Previous venereal history has been eliminated in our case by the negative Wassermann. It has occurred more in the male sex and in individuals of robust constitution and over thirty years of age. However, there was a case reported before twenty years of age. Our patient in regard to age comes within the general rule. The pathology offers a good deal of speculation and the histological picture of the lesions helps us to understand the clinical manifestations of the disease.

Granuloma fungoides occurs in two forms:

1. A form with a prefungoid stage, "erythermie mycosique" of Hallopeau and Besnier.

2. A form without a prefungoid stage, the "tumeurs d'emblée" of the French school.

The above classification is essentially in accordance with the views of Crocker, Unna, and the more modern authors.

The prefungoid stage may last for months and years. In our case it lasted for twelve years. It is characterized by a scaly or vesicular or by a dark-red, sharply circumscribed rash, or by a sort of urticaria. The dermatoses may appear and disappear several times before the tumors develop. The prefungoid stage is the most difficult to diagnose. In this stage the pathological changes are limited to the subpapillary vascular layer of the skin. Lerrede found a proliferation of fixed connective-tissue cells around the bloodvessels; likewise he observed some mast cells. Unna lays great stress upon the dilatation of blood and lymph spaces, which are prominent in this stage. This latter point stands in direct contrast to granuloma of tuberculosis and syphilis where the bloodvessels are obliterated. On account of the dilatation of the vessels in the papillæ there appears the hyperemia and edema of the skin. The edema of the skin in some cases forms a characteristic feature of the prefungoid stage. By and by the changes extend to the cutis until the hair follicles and glands disappear. This, however, occurs late. Before they are affected tumors may have formed; the epidermis becomes protruded, due to pressure occasioned by the cellular infiltration from beneath; then tumors form. They form nodules the size of a walnut or fist, and are of a bright red color. The tumors are sharply defined, more and more elevated, and then assume the appearance of tomatoes not only in their size and color but in structure, the capsule being thick and the contents semisolid.

The tumors develop on any part of the body or may be confined to the face, axillæ, or to a limb. In severe cases they may spread all over the body. In our case they are located on the shoulders, trunk, arms, and neck.

The tumors may form without a preceding erythema, "tumeurs d'emblée." In this form the number of nodules is more limited

than in the first one. The microscope shows that the tumor stage is an exaggeration of the prefungoid stage.

The tumor consists of loose connective tissue which encircles groups of cells which vary greatly in size and shape. In our case the cells as detailed above are small round cells; they are poor in protoplasm; the nuclei take an intense basic color; they are at best brought out by the polychrome methylene blue stain. These cells make up the bulk of the tumor. Some of them can be traced, penetrating the layers of the epidermis, and in one or two places in our sections they have accumulated in spaces between the Malpighian and stratum lucidum. Then one observes short spindle cells scattered in between the groups of the small round cells. The origin of the spindle cells is a matter of speculation.

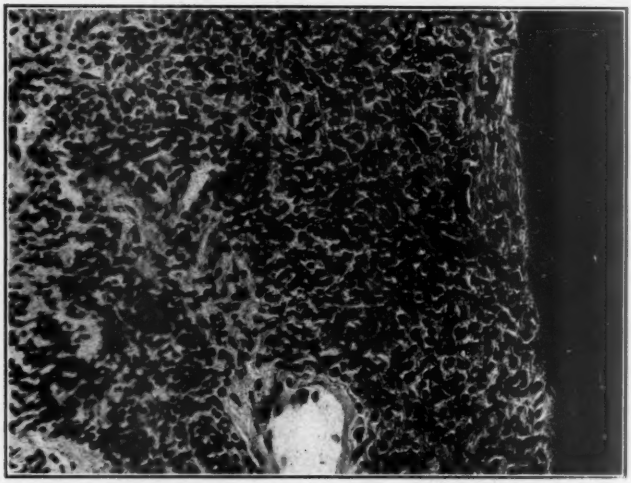

FIG. 2.—Note the flattened-out papillæ; 2, blood-spaces are filled with cells similar to those that make up the bulk of the tumor.

Cells somewhat ovoid, larger than the round cells, are noticed. The nuclei of these cells are paler than those of the small round cells; many of these cells show mitotic figures, and likewise one can see that these cells are undergoing crenation and fragmentation; what appear have rings of granules, probably the remnant of the ovoid large cells. Whether these cells correspond to the cells described by Unna as specific of granuloma fungoides we are not prepared to say.

An interesting question arises as to the source of the cells. Lerrede representing the French school, and Poltauf, the Austrian, believe that the cells are partly derived from the lymphocytes of the blood. From the study of our case we are inclined to share Unna's view-

point that the cell infiltration is derived from the connective tissue; for were the origin of the cells the blood then the blood analysis ought to show some changes, while this is not the case, as in our patient the small lymphocytes were fifteen and the large lymphocytes 4 per cent.

In our sections a few dilated bloodvessels are seen which in addition to the red cells contain cells similar to those found in the tumor. This fact would show that the tumor cells are being carried away from rather than being brought to the tissue affected. Besides the above cells we have seen one or two eosinophiles; several giant cells were also observed.

Plasma and mast cells have been reported to have occurred in cases of Galloway, Macleord, Lerrede, etc.; in our case sections stained for them did not reveal any.

The connectve tissue of the subepithelial layer in our sections has become obscured by the cellular infiltraton. In some areas the connective tissue is degenerated (it stains pale pink with Giemsa's stain). The degeneration probably results from the pressure exerted by the cellular infiltration. In between the cells of the tumor one can find occasional fine fibrous threads.

In the prefungoid stage Unna claims that the elastic tissue is preserved. On account of this latter finding, Ranvier has classified the condition under cutaneous lymphadenie, the tissue resembling a lymphoid structure, yet this view-point is rejected by the more advanced work on the subject.

In our case the cells in some places go as deep as the subcutaneous fat tissue; however, they do not penetrate the underlying deep structures. Some of the hair follicles and sweat glands are embedded in a collection of small round cells, and in some places the sweat glands have undergone proliferation. The question whether the proliferation of the glandular epithelium is due to a stimulation caused by the cell infiltration or whether it is secondary to a toxin irritation can be speculated upon.

Whether there is some newly formed connective tissue or what appears to be connective tissue is merely the contrast between the displaced connective tissue by the cells and the tissue that is left is difficult to determine. It seems to us, however, that the cellular infiltration might have lodged upon the connective tissue and obscured it; and after the cells have become fragmented and absorbed then the preëxisting connective tissue came again to the front. This may explain the clinical picture of absence of scar tissue after spontaneous healing of the tumors.

The tumors may appear two or three years after the rash, or a longer interval of time may elapse. Our patient developed the tumors twelve years after the beginning of the rash. These tumors when properly treated usually do not recur, and when treated early they do not provoke any constitutional symptoms or cachexia. If allowed to go on untreated the patient usually dies from exhaus-

tion or from toxemia as a result of necrosis that takes place in the tumors. An interesting point about the tumors is that they do not give metastasis to any of the internal organs. However, cases with metastasis in the spleen have been reported. Duhring and Galliard also observed what appeared a metastatic growth in the bladder. Kaposi and Poltauf and others have reported metastatic tumors in the liver, pancreas, kidney, etc. Brandweiner has found metastatic growth in the brain. These cases are exceptional, and then it is questionable whether the metastatic tumors are of the same histological structure as the granuloma of the skin. It might be that a secondary lymphosarcoma has developed upon the site of the granuloma with the metastasis.

More commonly there is a hyperplasia of the lymphatics in various parts of the body.

Another interesting feature about these tumors is their spontaneous disappearance without leaving any trace behind them. The reason for it has been given above.

Granuloma fungoides must be differentiated from (1) sarcoma, (2) leukemia. Sarcoma arises from previously healthy skin; granuloma fungoides from a previously diseased skin. Sarcoma grows progressively in depth and involves the neighboring tissues; granuloma fungoides grows more in width and never penetrates the underlying neighboring tissues; sarcoma gives metastasis to the internal organs; granuloma fungoides rarely gives metastasis Clinically, sarcoma runs a different course than granuloma fungoides; it does not tend to a rapid appearance and subsequent disappearance by absorption and necrosis as seen in granuloma fungoides.

Histologically: In sarcoma the cells are more uniform in size and shape and the deeper layers of the cutis are involved first and the epidermis not at all unless it breaks down. In granuloma fungoides there is a great variety of cells and the infiltration is superficial.

From leukemia it must be differentiated, for there are a great many authors, especially of the French school (Lerrede), and only recently Pellagiti, who have attempted to bring forth evidence as to granuloma fungoides being one of the manifestations of leukemia. However, the general clinical picture and blood-findings of leukemia are sufficient proof to the contrary.

In conclusion we would state, (1) granuloma (mycosis) fungoides is primarily a chronic, cutaneous disease of unknown etiology; (2) the histological picture explains the clinical manifestations of the disease, such as the erythema and edema of the skin of the prefungoid stage, the tumor formation, and the spontaneous appearance and disappearance without any scar tissue left behind them.

REVIEWS

DISEASES OF THE HEART. By JOHN COWAN, D.Sc., M.D., F.R.F.P.S., Professor of Medicine, Anderson's College Medical School. With chapters on THE ELECTROCARDIOGRAPH. By W. T. RITCHIE, M.D., F.R.C.P.; and THE OCULAR MANIFESTATIONS IN ARTERIOSCLEROSIS. By ARTHUR J. BALLANTYNE, M.D., F.R.F.P.S. Pp. 429; 3 colored plates, 196 text illustrations. Philadelphia and New York: Lea and Febriger, 1914.

THIS work is a practical treatise upon the diseases of the heart and arteries considered in the light of the recent additions to our knowledge of the pathological histology and physiology of the heart and of the facts acquired from the use of the sphygmomanometer, polygraph and electrocardiograph, and orthodiagram.

The book opens with a chapter on the pathological changes affecting the myocardium and their clinical significance. Four chapters are devoted to the etiology, pathology, symptoms, eye-ground changes and treatment of arteriosclerosis, with a discussion of the relation of nephritis and of the accepted views upon the prognostic significance of high blood-pressure and its treatment. The myogenic theory of the cardiac action is then presented, followed by a clear exposition of the method of interpreting polygraphic tracings and electrocardiograms and of the significance of the recognized pathological alterations in these graphic records. Ten chapters are devoted to the disturbances of the myocardial function including juvenile arrhythmia, extra systoles, nodal rhythm, pulsus alternans, heart-block, dilatation, paroxysmal tachycardia, auricular flutter and auricular fibrillation. The etiology, symptomatology, characteristic graphic records, prognostic significance and treatment of each of these is considered and this portion of the book is amply illustrated with tracings and case histories. The remaining thirteen chapters are devoted to acute endocarditis, chronic valvular disease and pericarditis; their etiology, symptoms, and physical signs, with especially good chapters upon prognosis and treatment.

Of the illustrations about sixty-five portray the gross and microscopic pathology of the heart and arteries while the remainder are polygraphic, electrocardiographic, and blood-pressure curves and diagrams of the cardiac murmurs.

The author presents clearly all the important recent advances

in cardiovascular pathology and physiology and the bearing of the newer clinical methods of precision upon the diagnosis, prognosis, and treatment of cardiovascular disease. J. H. A.

Acute Poliomyelitis. By Ivan Wickman. Translation by Dr. Wm. J. A. M. Maloney, F.R.S. Ed. Pp. 135; 12 illustrations. New York: Journal of Nervous and Mental Disease Publishing Co.

One of the worst epidemics of poliomyelitis or Heine-Medin's Disease in recent years was that which occurred in 1905 simultaneously in Norway and Sweden. This was fully described by the author of the present volume, Ivan Wickman. As a consequence, this work on poliomyelitis is an excellent study of this disease, both from the clinical and pathological standpoint. Unfortunately there is nothing decidedly new that can be said regarding its etiology, prophylaxis, and treatment. T. H. W.

The Practice of Surgery. By James G. Mumford, M.D., Lecturer on Surgery in Harvard University; Surgeon of Clifton Springs Hospital, etc. Second Edition. Pp. 1032; 683 illustrations. Philadelphia and London: W. B. Saunders Co., 1914.

The title of the work describes it accurately. It is an account of the practice of surgery—as seen in one's daily work. The facts are gleaned from years of practice in hospitals, lecture-rooms, and private work. No attempt is made to cover all the phases of surgery of today. Theories and opinions not well grounded are omitted. Pathology and bacteriology are practically omitted. The minor details and fundamental steps in a surgical training are assumed as already belonging to the reader.

There is a discussion of antiseptics, sutures, needles, anesthetics, and a host of other minor surgery subjects. In other words, the book is not one for students or beginners in surgery, but for those well grounded in the fundamentals.

The arrangement of the contents is unique in a way, precedence being given to the commoner and more important subjects. The first chapter on the abdomen and the chapter on minor surgery are the best in most respects. Here the author seems to inculcate a personal element into the text. The matter of bursæ and their diseases and fractures could be handled with a little more fulness in reference to diagnosis in the first instance and treatment in the second instance.

The book contains many illustrations that are excellent and very instructive, but there are some specimen illustrations that are useless to a surgeon. Illustrations showing the ultimate appearance of a massive cancer of the neck, or of a sarcoma of the humerus, take up space that could be used to better advantage.

On the whole, the author has given us an instructive and pleasing work in its limited field. It is well written, revised, edited, and worthy of careful perusal. E. L. E.

RESEARCH STUDIES IN PSORIASIS. By JAY F. SCHAMBERG, M.D., JOHN A. KOLMER, M.D., A. I. RINGER, M.D., and G. W. RAIZISS, PH.D. Journal of Cutaneous Diseases, Including Syphilis.

IN reviewing the excellent article of Schamberg, Kolmer, Ringer, and Raiziss, and acting as a critic in regard to its deductions, it is fair to state that the 140 pages contain only the preliminary findings, and the investigation is still in progress.

The research has been conducted along two distinct lines, bacteriological and metabolic. Bacteria were sought in twenty-four cases of psoriasis, and sixteen different organisms were isolated from fifty-seven cultures. All of these were classified, excepting a diplococcus, which was discovered in five of the cases. None of the organisms reproduced the disease in either man or animal, and the findings are therefore of negative value.

The protein metabolism was studied in eight psoriatic subjects. It was found that an individual with psoriasis eliminates less nitrogen in the urine than a normal person, on a corresponding diet, and that there is also a greater retention of nitrogen, even in a low nitrogenous diet. The greatest retention of nitrogen was determined in the most extensive and severe outbreaks, and apparently was somewhat proportionate to the same. A betterment was produced if the patient was given a diet low in nitrogen. If, however, the individual after the disappearance of the eruption was fed upon highly nitrogenous food the psoriatic eruption could not be reproduced.

The writers infer that psoriasis is due to an abnormal retention of nitrogen. In order that this assumption of the investigators should prove of conclusive value, it will be necessary to cause a disappearance, rather than a betterment, of the outbreak, in a considerable number of cases, by a diet low in nitrogen, and also to reproduce the disease, after the total eradication of the eruption, by the administration of highly nitrogenous food. It is to be hoped that the continuation of the investigation will prove the cause of this chronic and troublesome disease. F. C. K.

A Synopsis of Medical Treatment. By George Cheever Shattuck, M.D., Assistant Physician to the Massachusetts General Hospital. Second edition; pp. 96. Boston: W. M. Leonard, 1914.

This is a small, linen-covered volume, dealing in a brief manner with the treatment of several important medical conditions. In addition it details in summary fashion the facts concerning salvarsan, neosalvarsan, and a few of the drugs used in every-day practice.

Some new material has been aded and a number of minor changes made in this second edition.

The printed matter occupies but one side of the page, while the reversed one remains for purposes of note-taking. The book was primarily prepared to meet a local didactic need, and as such it finds its only real use.

We trust that in future editions completeness will not be sacrificed for brevity. T. G. S.

Cancer: The Problem of its Genesis and Treatment. By W. Forbes Ross, Late Civil Surgeon, His Majesty's Guards' Hospital, London. Pp. 261; 4 illustrations. London: Methuen & Company.

The book is written in popular form as an exposition of the author's views in regard to the origin and treatment of cancer. He argues that the altered nuclear division leading to cancer formation is the result of deficiency of potassium in the cells. He thinks that the administration of large doses of various salts of potassium will prevent recurrence of an operated cancer, cause the regression of inoperable cancer, and cure involved lymph nodes. He associates this form of treatment with radium emanations and kataphoresis in the form of what he calls "electrical perfusion" of potassium. In a general way the construction of the book follows a logical sequence and it is printed in large type on rough paper; but the English and punctuation are extremely careless, ofttimes to the point of confusion. The style is pedantic; and needless reiteration of fairly well established facts is interspersed with undue criticism of the conservatism of the average physician and illy drawn conclusions founded on the opinionated logic of the author. The accounts of the cases are more after the style of a patent medicine testimonial than the scientific report of a case. The records of the author's observations are incomplete, his few experiments are insufficient and his deductions are poorly founded. The book is quite unconvincing to the scientific reader. H. T. K.

OPERATIVE SURGERY. By PROFESSOR V. SCHMIEDEN, Privatdozent of Surgery in the University of Berlin and ARTHUR TURNBALL, M.B., Demonstrator of Anatomy in the University of Glasgow. Second edition. Pp. 345; 435 illustrations. New York: William Wood & Co.

THE author and English editor have compiled and presented in this comparatively small volume the subject of "Operative Surgery" in a remarkably concise, adequately illustrated and altogether commendatory manner. The present second edition has undergone much revision and contains many additions, especially in the chapters dealing with the cerebellum, tongue, pharynx, bones, joints, nasal tamponade, tooth extraction and lymphadenectomies, while the chapter on the surgery of the stomach and intestines has been entirely remodelled.

Obviously the aim of the author has been to present the fundamental or classical procedures in operative surgery, to eliminate obsolete operations and to modernize the subject as far as may be consistent with brevity.

Realizing the real purpose of the book, commendation far outweighs criticism. Nevertheless, it seems to the reviewer, that in a work of this type, some time and space should be devoted to ligatures in general and particularly to the tying of knots and a consideration of appropriate needles, etc. In the chapter on gastrointestinal surgery, the German custom of employing interrupted sutures in anastomoses appears too conspicuously in the illustrations, for a method which bears the burden of untold deaths consequent upon leakage and peritonitis.

The section on "Operations on the Urogenital System" does not impress one as being so praiseworthy as other sections. Not only here, but throughout the book there is noted, in a number of instances, a disproportionate consideration as to space devoted to operations of comparative unimportance. For instance, more space is given to external urethrotomy and almost as much to phimosis operations and amputation of the penis as to prostatectomy.

B. A. T.

VACCINE AND SERUM THERAPY. By EDWIN HENRY SCHORER, B.S., M.D., D.P.H., Assistant, Rockefeller Institute, New York City, etc. Second edition. Pp. 300; 18 illustrations, 3 charts, and 1 plate. St. Louis: C. V. Mosby Company.

THIS book gives in compact form the information useful to the general practitioner on the theory of immunity, specific diagnosis of infectious diseases, and serum and vaccine treatment. The

author makes a special point of the collaboration of specific and general methods in the diagnosis and treatment of infectious diseases. He insists on the importance of accurate diagnosis of the etiological factor, and rightly condemns empirical and "shotgun" treatment by commercial vaccines. Stress is also laid upon the superiority of autogenous over stock vaccines where the former are available.

The book should prove a useful source of information to the general practitioner upon a subject that is daily gaining more and more attention. R. H. I.

DISEASES OF THE MOUTH, FOR PHYSICIANS, DENTISTS, MEDICAL AND DENTAL STUDENTS. By Prof. DR. F. ZINSSER, Director of the Department of Dermatology at the City Hospital, Lindenburg; Dozent at the Academy for Practical Medicine, Cologne. Translated and edited by JOHN BETHUNE STEIN, M.D., Professor of Physiology at the New York College of Dentistry, Late Instructor in Genito-urinary Diseases at the College of Physicians and Surgeons, New York City. Pp. 269; 73 illustrations. New York: Rebman Co.

UNDER this comprehensive title, the author offers us an excellent presentation of syphilis of the mouth and neighboring parts, with the differential diagnosis from conditions closely resembling that disease. In fact, the book is simply a treatise on syphilis as seen in the oral cavity, with mention of other diseases only so far as they are liable to be confused with it. There are but 67 pages of actual text, the remainder being occupied by the plates and the descriptions attached to them. The volume is therefore a hand-atlas rather than a text-book, as might be thought from the title. The plates are beautifully colored, and give life-size representations of almost all the conceivable lesions of syphilis in its various stages as it may occur in the mouth. These illustrations fulfill their purpose almost as well as actual study of the living subject.

The claim that nearly all developmental defects in the structure of the teeth are due to hereditary syphilis is contrary to general experience. The author states that rickets and tuberculosis may possibly play a part in dental hypoplasia, but makes no mention of such well recognized causes as scarlet fever and measles. The chronological chart of the calcification of the teeth given at the end of the book seems to bear out the contention that syphilis is practically the only disease that could have such a deleterious effect at the calcification period. But this period, instead of occupying only a few months after birth as claimed by the writer, in reality extends over several years for not only the crowns of the

incisors but of all the permanent teeth except the first molar. Thus the child may be exposed to the effects of several of the eruptive fevers during the calcification of the teeth, these effects showing themselves in hypoplasia.

The points to which attention has been called in no way lessen the immense value of the illustrations, for which the book is to be recommended as a great help in diagnosis. R. H. I.

MEDICAL AND SURGICAL REPORTS OF THE EPISCOPAL HOSPITAL. Edited by A. P. C. ASHHURST, M.D. Volume II; pp. 427. Philadelphia: Wm. J. Dornan, 1914.

THE appearance of a second volume of these reports, coming so rapidly after the first, is a splendid indication of the literary activities of the Hospital Staff. The present volume maintains the same form and general characteristics as the first. It is carefully edited and contains a mass of interesting and diverse information. J. H. M., JR.

THE INTERPRETATION OF RADIUM, BEING THE SUBSTANCE OF SIX FREE POPULAR EXPERIMENTAL LECTURES DELIVERED AT THE UNIVERSITY OF GLASCO. By FREDERICK SODDY, M.A., F.R.S., Independent Lecturer in Physical Chemistry and Radioactivity in the University of Glasco. Third edition. Pp. 284, 33 illustrations. New York: G. P. Putman's Sons.

THE work is exceedingly well written, in an interesting and popular style and, with a very few exceptions, without the use of mathematical equations. The author confines himself to the physical and chemical sides of radioactivity and does not mention the biological and therapeutic sides, except in a few sentences.

Chapter I is an introduction containing general statements in regard to the science of radioactivity. In Chapter II the author tells of the discovery of radium, and of its general properties including the evolution of energy. The next two chapters treat of the characteristics of the rays from radium; and Chapter V of the source of the energy, the atomic disintegration theory, etc. In the remaining seven chapters the relation of helium to the radioactive processes, the laws of radioactive changes, the ancestry of radium (uranium, ionium, etc.) are described; radium's descendants and their characteristics, some general ideas as to the evolutions of matter, etc., and finally, the thorium and actinium series are described. The last chapter was added for this third edition.

The character of the research work that the author has done is an ample guarantee for the general accuracy of the statements contained in the book. A few flights of fancy in Chapter V may be pardoned on the ground that they were designed to appeal to the imagination and stimulate the interest of the public. W. D.

TUBERCULIN IN DIAGNOSIS AND TREATMENT. By LOUIS HAMMAN, M.D., Associate in Medicine in the Johns Hopkins University and to the Johns Hopkins Hospital and SAMUEL WOLMAN, M.D., Instructor in Medicine in the Johns Hopkins University. Pp. 381; 30 illustrations. New York and London: D. Appleton & Co.

DURING the twenty-three years which have elapsed since Koch introduced tuberculin as a therapeutic and diagnostic agent, an enormous literature has grown on the subject, a large part of it being in foreign languages; this has been still further increased by the various diagnostic modifications. In reviewing this mass of material and bringing together what is best in a consecutive narrative, Hamman and Wolman have rendered a valuable service.

The first chapter deals with the tuberculin reaction, tuberculin hypersensitiveness, and immunity. The second chapter gives in detail the different methods of employing tuberculin for diagnostic purposes. This chapter can be read with profit by many who have hazy notions as to how the reactions are to be interpreted. This is especially true of the von Pirquet test, which is so generally employed. Of this test they say, "that a positive reaction is of considerable value in diagnosis during the first year of life, of less during the second year, of little in childhood, and none in adult life. On the other hand, a negative reaction excludes, with definite exceptions, the presence of an active tuberculous lesion." In other words, "tuberculin is an index of tuberculous infection, not of tuberculous disease—." Given a combination of obvious physical signs and definite symptoms, the use of tuberculin is not necessary. "Tuberculin can add so little to their assurance that its use, under such conditions, is superfluous."

While the authors recognize that accidents have followed the conjunctival test, they feel justified in continuing its use because their own experience has been free from untoward results. In spite of this, however, we cannot but feel that the conjunctival test should be avoided.

The third chapter considers in detail the therapeutic uses of tuberculin. Any one wishing to employ the remedy will find here an excellent account of how it should be administered.

Hamman and Wolman are of those who believe that tuberculin

has established itself. While this is true of some forms of tuberculosis, notably that involving the eye, we cannot escape the conviction that so far as pulmonary tuberculosis is concerned, a verdit "not proven" is not amiss. H. R. M. L.

AN INTERNATIONAL SYSTEM OF OPHTHALMIC PRACTICE. Edited by WALTER L. PYLE, A.M., M.D., Philadelphia. Ophthalmic Semiology and Diagnosis by CHARLES H. BEARD, M.D., Surgeon to the Illinois Charitable Eye and Ear Infirmary (Eye Department), Oculist to the Passavant Memorial Hospital and the North Star Dispensary (Chicago). Pp. 400; 84 illustrations. Philadelphia: P. Blakiston's Son & Co. H. R. M. L.

THIS work offers as nearly as may be to the student a guide in the diagnosis of diseases of the eye from a master of clinical ophthalmology. The author properly describes it as the only work devoted exclusively to ocular semiology. The writer does not merely detail the different symptoms, but connects them with the underlying pathological and anatomical conditions.

Unlike most systematic treatises on ophthalmology which are usually briefest in describing the diseases of the fundus, in this work the latter occupies just about one-half of the whole, a circumstance indeed to be expected from so skilful a delineator as the author who has devoted much time during the past thirty years to the original drawings from which the illustrations are derived.

Both the student and the accomplished practitioner of ophthalmology will find in this book a storehouse of most valuable information brought together in accessible form which will spare many hours search and provide him with a vade mecum to which he can constantly turn with a confidence in his daily professional labors.

T. B. S.

A TREATISE ON PELLAGRA FOR THE GENERAL PRACTITIONER. By EDWARD JENNER WOOD, S.B., M.D., Chairman of the Pellagra Commission. North Carolina Board of Health. Pp. 377; 38 illustrations. New York and London: D. Appleton & Co.

THE appearance of a new book on Pellagra seems to surfeit the field of literature on this subject, as a host of articles have recently appeared in the current magazine literature, several other treatises have just been published, and numerous boards of health have issued comprehensive and complete reports upon pellagra. However, Wood, shortly after the conception of the present work,

at a time when there was not a single complete treatise on pellagra, was taken sick and the publication of the work was delayed more than a year, during which time the subject received much attention.

Wood, after a complete historical sketch, details fully the various theories of the causation of pellagra, the most important, most widely discussed and investigated problems of the disease. The two most generally accepted theories of the cause of the disease are that it is due to a specific parasite which is possibly conveyed by an intermediary host or it is the result of the ingestion of mouldy corn which causes pellagra, either because it is an insufficient or unappropriate food, or because it contains some toxic substance or because it is a carrier of some form of parasite. The author believes that the first theory is the most acceptable and advances good arguments to uphold his position. As to the specific biting fly of the genus Simulium acting as the intermediate host, he does not feel so confident. In the succeeding chapters the other aspects of the disease are dealt with in a comprehensive and complete manner. The whole subject is presented in a thoroughly instructive yet most pleasing way, so that the work will stand in the forefront of American treatises on this very interesting condition.

J. H. M., Jr.

Tropenkrankheiten und Tropenhygiene. By Prof. Dr. Reinhold Ruge, Marine-Generalarzt in Kiel, und Dr. Max zur Verth, Marine Oberstabsarzt in Kiel. Pp. 463; 201 illustrations; 8 maps. Leipzig: Klinkhardt.

The authors open with a discussion of tropical climates, acclimatization, clothing, habitation, diet, and other general considerations in relation to residence in the tropics. They then proceed to take up with great thoroughness the discussion of specific diseases. Distribution is considered at length for each disease and is illustrated by shaded maps for malaria, sleeping sickness, kala-azar, yellow fever, beri beri, schistosomiasis, ankylostomiasis, and filariasis. The life history of the etiologic organism of each disease receives liberal consideration. The pathology, symptomatology and treatment follow.

The infectious diseases and the infestations with worms or arthropods are first considered. Then tropical skin diseases, from various animal and plant venoms or poisons, and finally a brief discussion of the peculiarities of the universally distributed diseases when occurring in the tropics. The book is liberally provided with illustrations of lesions, of etiologic organisms, and of temperature charts.

J. H. A.

How to Diagnose Smallpox. By W. McC. Wanklyn, B.A. (Cantab.), M.R.C.S., L.R.C.P., D.P.H., Assistant Medical Officer of the London County Council, and Formerly Medical Superintendent of the River Ambulance Service (Smallpox) of the Metropolitan Asylums Board. Pp. 104; 11 illustrations. New York: Paul B. Hoeber, 1914.

The writer has compiled a practical volume, with charts and a few excellent photographs, to assist in the diagnosis of smallpox, both in its common and rare forms. The usual distribution of the typical outbreak is emphasized; the rash is observed in ascending order of density on the abdomen, chest, back, arms, legs, and face; the outbreak showing a great predilection for the exposed portions of the body and areas of irritation.

The subject is treated in eleven chapters. The spread of smallpox by unrecognized cases; unrecognized cases and their remedy; practical points in the method of examination; individual cases of smallpox considered with a view of diagnosis; individual cases and other features of the rash; explanation of the distribution of the rash; other factors in diagnosis; differential diagnosis; initial rashes; differential diagnosis of chicken-pox and measles; additional points.

The writer comments upon the delay in the recognition of smallpox as an important factor in its spread. The important point is emphasized that the clinical recognition of the rash and its differentiation from the various exanthemata and other cutaneous outbreaks is frequently of more importance than the indefinite and frequently confusing prodromal symptoms and history. The volume is written, in a great part, in a conversational manner, making easy reading and bringing out clearly the points the writer wishes to emphasize.

The author's experience with smallpox extends over twenty years and a study of over ten thousand cases. F. C. K.

Chemical Pathology. Being a Discussion of General Pathology from the Stand-point of the Chemical Processes Involved. By H. Gideon Wells, Ph.D., M.D., Professor of Pathology in the University of Chicago, and in Rush Medical College, Chicago. Second Edition. Pp. 616. Philadelphia and London: W. B. Saunders Co., 1914.

The many recent substantial contributions to the literature of biological chemistry have made necessary this new edition of the standard American text-book on chemical pathology. Comparison with the original edition, published seven years ago, shows the dimensions of the book to be considerably enlarged and sixty-seven

new pages added. Especially the chapters on immunity, tumors, and diabetes are amplified. In the introductory chapters Wells gives an epitome of the modern views concerning the chemistry and physics of the cell, including in this a rather illuminating discussion on colloids, and concerning the nature and action of enzymes. Then, after covering in the next 130 pages the chemistry of bacteria, of animal parasites, and of the immunity reactions, he enters into a discussion, from a physicochemical view-point, of general pathological lesions, devoting chapters to inflammation, circulatory disturbances, edema, retrogressive changes, pigmentations, tumors, metabolic disturbances, ductless glands, and finally diabetes. To those familiar with the literature of the past decade bearing on the subjects discussed this book will be a review of the important facts established. To those who have not had the opportunity of covering that literature it will be a fascinating and able summary of the same. To all, because of the more than a thousand reference footnotes, including cross references to many other bibliographies; it will be a most valuable guide to the original sources in the literature on chemical pathology. T. G. M.

A Handbook for the Postmortem Room. By Alexander G. Gibson, D.M. (Oxon.) F.R.C.P. (Lond.), University Demonstrator in Pathology, Oxford; Honorary Assistant Pathologist to the Radcliffe Infirmary, Oxford. Pp. 136. Oxford University Press, 1914.

This booklet is a guide for the student in the technique of autopsies, and is based upon Virchow's methods. A large amount of anatomy is necessarily described. Lymph "glands" are mentioned instead of lymph nodes. The thoracic portion of the spinal cord should not be referred to as the "dorsal." The corpus callosum does not have "fornices." The squamous portion of the "petrous" bone doubtless means the squamous portion of the temporal bone.

As to the postmortem technique, the very practical method of measuring the body by a permanent scale, notched in the table, is not mentioned, but the old wooden staff is referred to. Examination by bacteriological methods should be at least referred to before the organs are removed, since the chapter which covers this is at the back of the book, thus minimizing the prominence and importance of such investigation. In the histological methods, in place of "4 per cent. formaldehyde" we presume 4 per cent. formalin is meant. Again, in investigation of the labyrinth of the ear, we consider the parts too minute for efficient gross inspection, and think that histological methods should be recommended instead. Englishisms should be avoided. For example, not many patholo-

gists outside of England or its colonies know the exact size of the proverbial "threepenny bit," and while most of us have seen a lung sink in water, but few have seen it "swim," yet we all have seen it float.

The book is well printed on good paper, has a flexible binding, and is of hip-pocket size. It can be warmly recommended, for a mastery of its terse directions will surely make one expert in post-mortem technique. P. G. S., Jr.

Ten Sex Talks to Girls (Fourteen Years and Older). By Irving David Steinhardt, M.D., Instructor in Clinical Surgery and Assistant Surgeon, Cornell University Medical School. Pp. 193; 6 illustrations. Philadelphia and London: J. B. Lippincott Company, 1914.

The originals of these lectures or talks to girls were delivered before several organizations in New York, and later published in the *New York Medical Journal*. The interest in them was so great, and the demands for reprints so numerous that the author issued them with minor revisions and enlargements in their present form. The descriptions and discussions are so simple, direct, and accurate without going into unnecessary and gruesome details that physicians may well recommend the book to those seeking advice on this subject. The book would find its best use in the hands of young girls after some general instruction by mothers. F. H. K.

Fundamental Basis of Nutrition. By Graham Lusk, Professor of Physiology, Cornell University Medical College, and Scientific Director of the Russell Sage Institute of Pathology. Pp. 62. New York: Yale University Press, 1914.

In order that those desirous of learning may obtain a better conception of the principles of nutrition than has heretofore been afforded them by the numerous popular newspaper and magazine articles that from time to time have appeared, the well-known lecture of Professor Lusk, which was delivered in 1913 as the Anniversary Address of the New York Academy of Medicine, has been published as a small book.

The subject is discussed in a way that makes it clear to any intelligent person. Facts which under ordinary circumstances would make but dry reading are presented with that resourcefulness and interest so characteristic of the distinguished author. The history of the development of our modern conception of nutrition;

the caloric needs of the body under various conditions and the importance of basing a dietary upon caloric values; the role of the various proteins in the animal economy; the dietetic habits of different races and different classes of individuals; the importance of vitamines as illustrated in beriberi; and finally the economic value of various kinds of food are discussed. No one, whether layman or physician, can read this lecture without obtaining a clearer conception of the science of nutrition and without having his attention directed to the great problems of fundamental economic importance that have arisen from our present-day dietetic habits. G. M. P.

BEDSIDE HEMATOLOGY. By GORDON R. WARD, M.D., Fellow of the Royal Society of Medicine, London. Pp. 394. Philadelphia and London: W. B. Saunders Co., 1914.

DR. WARD states that his book is intended as "an introduction to the clinical study of the so-called blood-diseases and of allied disorders." He has carefully followed this idea, so that throughout the book there is a decided tendency to stick solely to the elimentary and to avoid the complicated, unproved, and much-discussed theories that are generally agitating hematologists.

The book begins with a novel classification of blood-disorders which is certainly practical. In the succeeding chapters this classification is adhered to and the various disorders in each group are fully discussed, particular stress being laid upon pathology and symptomatology. The remaining chapters deal with methods of treatment.

Several criticisms may be made of the author's method of dealing with his subject. The chapter on methods of making a blood-diagnosis is not sufficiently complete; the important blood-disorders are dismissed with too short a discussion of pathogenesis, while the less important conditions are not discussed at all from this point of view; there is an absence of good colored plates illustrative of the blood-picture in any blood-disorders; while lastly, treatment is often insufficient, while it is certainly not specific enough in most instances. The pathological sections and those dealing with the symptomatology are excellent and could be improved upon with difficulty. Furthermore, the chapter upon the blood in various diseases is particularly valuable.

The whole book is extremely practical and good common-sense is used in the handling of the subject matter. For this reason it should undoubtedly meet with a most gratifying reception.

J. H. M., JR.

DIET LISTS OF THE PRESBYTERIAN HOSPITAL, NEW YORK CITY. Compiled, with Notes, by HERBERT S. CARTER, A.M., M.D., Associate in Medicine at Columbia University and Associate Visiting Physician to the Presbyterian Hospital, New York City. Pp. 129. Philadelphia and London: W. B. Saunders Company, 1913.

THIS book in no sense is to be regarded as a work on dietetics. It is what it is represented to be, an intelligent compilation of the various diet lists that by experience at the Presbyterian Hospital have been found useful and practical.

Various types of diets are detailed in tabulated form. For example, regular house diet, convalescent diet, soft diet, milk and liquid diets are presented and briefly discussed. Various kinds of typhoid diets are next given. Salt-poor and purin-free diet lists are explained. Gastric diets are entered into with considerable care and diabetic diets are emphasized in great detail. In addition, diets for constipation, diarrhea, obesity, etc., are given. Useful features of the book are the additions of various gastric and intestinal test diets, a table of carbohydrate equivalents, and a list of useful receipts for special dishes suitable to diabetics. At the end of the book are given a table of the average chemical composition of American foods and Fisher's table of standard portions.

Frequent comments by the author furnishes valuable explanations and suggestions. For the practising physician who has little time and usually less inclination to work out accurate diet lists, this collection of diets will prove of great help and undoubted value.

G. M. P.

PHARMACOLOGY, CLINICAL AND EXPERIMENTAL. A GROUNDWORK OF MEDICAL TREATMENT. By H. H. MEYER AND R. GOTTLIEB, Professors of Pharmacology at Vienna and Heidelberg; Translated by J. T. HALSEY, Professor of Pharmacology, Therapeutics, and Clinical Medicine at Tulane University. Pp. 604; 64 illustrations. Philadelphia and London: J. B. Lippincott & Co., 1914.

CONSIDERING pharmacology as the "reaction of living organisms to various chemical agents," the authors have made an able presentation of scientific drug therapy, with frequent references to physiology and the seat and causes of the pathological conditions involved. As its name implies, their book is more than a text-book of therapeutics, in that it considers the pharmacological action of certain drugs not used in medicine, for example, curare, the first drug discussed. On the other hand, it does not attempt to include remedies other than drugs, such as massage, electrictiy, baths and so forth.

A fundamental division of all drugs is made into two classes: Organotropic (drugs influencing organs and their functions), and etiotropic (those acting on the causative agents of disease). The table of contents is divided into eighteen chapters, the first fourteen being devoted to the pharmacology of the several organs; the last four to the pharmacology of heat regulation, of inflammation, etiological pharmacological agents, and factors influencing pharmacological reactions, Drugs are not considered individually, but under each organ that they affect pharmacologically. A copious list of original sources is given at the end of each chapter. All doses are given in the metric system only.

Numerous additional facts and opinions are inserted by the translator. These so frequently disagree with the authors and sometimes supply such serious omissions, that an original work by the translator would be awaited with interest. For example the important effect of digitalis on the conductivity of the heart, so well demonstrated, by Cushny, Mackenzie, and Lewis, is briefly dealt with between brackets on page 266.

The subject matter appears on the whole to be accurately and adequately given. Many of the newer synthetic compounds are given, with cautious estimations as to their probable value. Among the cathartics, the phthaleins are emphasized, including the phenoltetrachlorphthalein advocated by Abel and Rowntree. One is surprised, however, to find no mention of agar-agar or [redacted]etrolatum among the laxatives.

The book is well bound and well printed on good paper. A dangerous slip occurs on page 38, where 0.02 gm. of pantopon is said to correspond to 0.1 gm. of morphin instead of 0.01 gm. of morphin.

E. B. K.

THE CLINICS OF JOHN B. MURPHY, M.D., AT MERCY HOSPITAL, CHICAGO. Vol. III, No. 2, April, 1914. Pp. 212; 58 illustrations. Philadelphia and London: W. B. Saunders Company, 1914.

THE April number of Murphy's *Clinics* contains the first of "Murphy's Clinical Talks on Surgical and General Diagnosis," which have been advertised as a new feature for the current year. This talk has special reference to empyema, and to the Abderhalden test in tubal pregnancy. In the case of empyema presented the treatment consisted in drainage of the pleural cavity by a rubber tube inserted through an intercostal incision. There follow three cases of ectopia testis; a case of cholelithiasis treated by cholecystectomy; and a case of "acute pancreatic cyst." The latter was recognized eventually as a case of carcinoma, with pancreatogastric fistula; but its origin, whether gastric or pancreatic, does not appear to have been determined.

Dr. Mix continues to contribute the main interest to the discussion of "borderline" cases by his able presentation of facts bearing on diagnosis. Sometimes, however, it seems that the audience becomes confused by these discussions. Thus at page 274, during an operation on a patient with duodenal ulcer, Dr. Murphy says, "The air in the stomach has gone into the jejunum, and the stomach is collapsed." A visiting doctor remarks, "Dr. Mix just made the statement that there was gas in the stomach;" to which Dr. Mix rejoins: "No, I said that there was no gas in the stomach. I said that persons with duodenal ulcer frequently complained of gas in the stomach, and that it was not gas in the stomach but air pumped there in order to get rid of gas." Evidently the visitor did not appreciate the nice distinction between air and gas.

The classification of pathological conditions encountered in the thyroid gland, given by Dr. Murphy, is one that should be memorized by every general practitioner; it is only two pages long.

The most valuable portion of the present number is that on tuberculosis of the kidney, although here again classification and operative statistics from foreign clinics occupy a space of two pages. But Dr. Murphy has assembled the case histories of three patients recently operated upon, though at different times, and presents a clinical discussion of symptomatology and diagnosis which is as good as anything that has yet appeared in the *Clinics*.

Several cases of nerve lesions conclude the volume. In one of these patients, who suffered with pain referred to an amputated leg, sections of the sciatic nerve had been removed on various occasions by different surgeons, and he was at last sent to Dr. Murphy with the suggestion that the pain might be "cortical" in origin. Dr. Murphy and Dr. Mix reached the conclusion that it was neither cortical nor due to amputation neuromata, but to an ascending neuritis; and Dr. Murphy divided half of the cauda equina, which was found red and apparently inflamed. There was much immediate relief of pain, but in a few weeks the patient claimed that there was a return of the same pain, and Dr. Murphy concluded that in the light of our present knowledge of sensory nerve-root phenomena, such a recurrence of pain was inexplicable. The question arises, Was the pain really only psychological?

A. P. C. A.

THE CLINICS OF JOHN B. MURPHY, M.D., AT MERCY HOSPITAL, CHICAGO. Vol. III, No. 3, June, 1914. Pp. 207; 55 illustrations. Philadelphia and London: W. B. Saunders Company, 1914.

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is inserted a note to Dr. Murphy from the President of the senior class of the Northwestern University Medical School, expressing the thanks of the class to Dr. Murphy and his staff for their "regularity, punctuality, and faithful and efficient service in giving to us such a thorough and systematic course of instruction as we have received during this past school year." Next comes a remark by a "Gentleman" (in caps. and small caps.): "What's the matter with him?" The Class: "He's all right." Then follow Dr. Murphy's remarks in appreciation of the class' action.

Now, who, we may ask, is responsible for the insertion of this vulgar clap-trap? Is it the editor himself or is it the publisher? Is this kind of thing going to be continued, or is *Murphy's Clinics* ever to become a self-contained, dignified, non-notoriety seeking medium of conveying surgical knowledge? There are so many excellent features about these *Clinics* that it makes one sick at his stomach to find every once in a while such assaults as these on his sense of propriety.

One excellent feature in the present number is the discussion on the differential diagnosis of gastric and duodenal ulcer by Dr. Murphy and Dr. Charles L. Mix. There are also a number of case reports of tenoplasty, tendon transplantation, neuroplasty, etc., for deformities and disabilities of the hands and feet following infantile paralysis, traumatisms, infections, etc.; a case of arthroplasty of the elbow with a "splendid" result, although only 45 degrees of motion was present after five weeks; and several operations for fractures. There is also recorded a case of carcinoma of the hip, metastatic from the breast, treated by excision of the hip, and, at a subsequent operation, by bone transplantation to fill the defect. The patient had no recurrence, and was walking around the hospital, with the aid of crutches, when last reported, three months after operation. This is an example of Dr. Murphy's pioneer work. It makes conservative surgeons hold their breath and wait to see what is going to happen next. A. P. C. A.

COLLECTED PAPERS BY THE STAFF OF ST. MARY'S HOSPITAL, MAYO CLINIC, ROCHESTER, MINNESOTA, 1913. Edited by MRS. M. H. MELLISH. Pp. 819; 335 illustrations. Philadelphia and London: W. B. Saunders Company, 1914.

No fewer than twenty-eight names appear in the list of contributors to this year's volume from the Mayo clinic, and about a dozen of the names are unfamiliar, showing that "new blood" is constantly being infused into the work.

The papers dealing with the alimentary canal continue to hold first place in order of presentation and in quantity, but other departments of surgery seem to be eager contestants for the latter honor.

Second in order of presentation comes the department of urinogenital organs, which has advanced to its present highly honorable title from the less fashionable term genito-urinary (1905–1911), through that of urogenital, employed in the volume for 1912. May we expect next year to see it appear under the still more aristocratic title of urology? Third in order are the papers on the surgery of the ductless glands, all of them this year dealing with the thyroid gland. There follow eleven articles dealing with the surgery of the head, trunk, and extremities; eight on "technique;" and five general papers not otherwise classified, among them an interesting account of a visit paid by Dr. W. J. Mayo to some of the most important surgical clinics of Germany, Belgium, and Great Britain.

These articles, covering such a wide range of subjects, naturally are of various importance. Some are so excellent that others suffer by comparison. Were the latter found in the average medical weekly they probably would pass muster, but several of them are unworthy of preservation in a bound volume. It is not that the subjects of these inferior contributions are not of importance, not that they are not well presented, but that having been read once before some small country or suburban medical society, the address has then and there served its purpose when it has been delivered orally; it contains no record of new facts, reports no case histories, and being merely an ephemeral production has no justification for attempts at immortality. In a few instances the offence is carried further, and two or more papers of this description on closely allied if not indeed identical subjects are produced side by side, under the name of the same author. This criticism, which appears to us to be just, applies not only to the present volume but to past volumes as well; occurring only once it might be overlooked, but a persistent fault requires correction.

The contributions which appear to have most to recommend them are a few among those in the section dealing with the alimentary tract, such as Graham's observations on peptic ulcers; Smithie's on gastric ulcer and gastric cancer; and Carman on the Rœntgen rays in gastric cancer and ulcer; as well as a series of papers on the surgery of the female breast. It is curious to see the emphasis placed on ether as the best general anesthetic under all circumstances, and amusing to read the contemptuous remarks about nitrous oxide and oxygen anesthesia, since such contempt surely argues inexperience of satisfactory administration and of its resultant advantages.

It is a pity that the table of contents does not include the authors' names. The index of contributors, at p. 789, does not supply this deficiency. And it would give a certain added authority to the opinions expressed if somewhere the official status of the writers were described. A few other questions arise: Why is the cumbrous term "intercarotid paraganglion" better than our old friend the carotid body? Is the "new motor meal" described at p. 715

designed for automobile parties? Is not Mr. Thompson Walker intended at p. 761 when reference is made to Mr. Thomas Walker? And in the same place why is Mr. Burghard's name so misspelled?

A. P. C. A.

SURGERY OF THE VASCULAR SYSTEM. By BERTRAM M. BERNHEIM, A.B., M.D., Instructor in Surgery, Johns Hopkins University, Baltimore, Md. Pp. 104; 53 illustrations. Philadelphia and London: J. B. Lippincott Company.

BERNHEIM gives in sufficient detail, and with excellent illustrations, accounts of the methods of transfusion, bloodvessel suture, transplantation of a segment of vein or artery, and arteriovenous anastomosis or reversal of the circulation. The sections which follow evidently have been included only in an attempt to justify the sounding title which is given to this little monograph. These sections (varicose veins, surgery of the heart, aneurysms) are discussed in an entirely inadequate manner, even as regards questions of mere technique. The volume is padded, moreover, by twenty pages of statistics of operations for aneurysm abstracted from the classical articles of Monod and Vanverts. In view of the evident desire to issue a volume of fair size it is inexplicable that Bernheim should have omitted the terminal S in the name of the latter author.

In a new edition we believe it will be well for the author to eliminate some of the preaching in the earlier chapters and to limit the later chapters to descriptions of technique.

A. P. C. A.

PROGRESS

OF

MEDICAL SCIENCE

MEDICINE

UNDER THE CHARGE OF

W. S. THAYER, M.D.,

PROFESSOR OF CLINICAL MEDICINE, JOHNS HOPKINS UNIVERSITY, BALTIMORE, MARYLAND

AND

ROGER S. MORRIS, M.D.,

CHIEF OF THE DEPARTMENT OF INTERNAL MEDICINE, CLIFTON SPRINGS SANATORIUM AND HOSPITAL, CLIFTON SPRINGS, NEW YORK.

Hematuria in Appendicitis.—CARLIER and LEROY (*Prov. Méd.*, 1914, xxvii, 102) deal with the occurrence of hematuria during the course of appendicitis and independent of any lesion in the genito-urinary tract. This condition has received considerable attention in recent time and has been observed in both acute and chronic forms of appendicitis. In chronic cases hematuria may be the first and only symptom occurring suddenly in apparently normal individuals following a strain, sudden exposure to cold, etc. The hematuria may occur without pain, or may be accompanied by pain simulating renal colic. It may last only during micturition, occur every day, or recur at infrequent intervals over a period of years. Only after an exploratory laparotomy is the inflamed condition of the appendix discovered, and after its removal the hematuria permanently ceases. The same symptoms may occur during the course of an acute case, and if anything, are more prominent here. By suitable examination it has been shown that the bleeding comes quite consistently from the right side. In an analysis of 14 cases it was found in 9 that the tissues about the ureter were involved in the inflammatory process, but apparently injury to the urethral mucosa was not the cause for the hemorrhage. The bleeding might be explained on the basis of a nephritis induced by toxins originating in the appendix, but the occurrence of the right-sided source of the bleeding points to a closer relationship, which is explained by Carlier and Leroy on the assumption that either sterile or infected emboli reach the kidney by way of the retro-peritoneal veins and cause three infarctions or very circumscribed inflammation resulting in the former case in a simple hematuria, or in the latter a moderate grade of nephritis of the acute type.

A Rapid Clinical Test for Hyperglycemia.—Gitlow and Horowitz (*Biochem. Bull.*, 1914, iii, 272) have attempted to devise a rapid clinical method for the detection of hyperglycemia, especially one which can be applied to very small quantities of blood and one that is as useful to the practicing physician as the Fehling's reaction. The reagents employed are sulfuric acid, water, alpha-naphthol and alcohol, as used in the test originally devised by Molisch. The reagents are best added in the following order: alpha-naphthol; the solution to be tested; water and sulfuric acid; the latter two must be in the same amounts in all the tests. It is possible that a modification of this method which is not described in detail in the present paper may be applied to quantitative examination of sugar in the blood. Gitlow and Horowitz feel that the test is excellent and that the difference in color between tests performed on normal and hyperglycemic bloods is very marked and very readily detected.

The Origin and Development of Crescents.—Thomson (*Annals Trop. Med. and Par.*, 1914, viii, 85) deals with a study of crescents made on living individuals and in autopsy smears from cases dying in the Panama Canal Zone. The general deductions as the result of the observations made may be summarized as follows: Crescents require about ten days for their development into the adult state. This development takes place chiefly in the bone marrow and spleen. During all stages of its development the protoplasm of the crescent stains a greenish-blue and often a yellow color as compared with the deeper blue of the asexual schizonts. On the other hand the chromatin stains more faintly than in the latter, is less abundant and more granular and never breaks up into masses such as are seen in the segmenting forms. As regards the pigment in devloping crescents, this appears very early and remains scattered until the adult stage is reached. Thomson was able to find adult crescents in autopsy smears in spleen and bone marrow after eleven days' treatment with quinin. No evidence was obtained of parthenogenesis in crescents. From observations made upon crescents found in the peripheral blood the following conclusions are drawn: (1) Crescents are produced from ordinary asexual spores which develop somewhere in the internal organs and appear suddenly in the peripheral blood. The period of development is about ten days and the period of life in the circulating blood not more than a few days. The occurrence of crescents in the peripheral blood over long periods of time is due to the fact that they are constantly being replenished from recent asexual forms. Fresh broods of crescents appear in the blood every day, every other day, or at irregular intervals, depending upon the asexual sporulation. It would seem that quinin has no direct destructive action upon crescents either during their development or after, but it destroys the asexual spores, the source of supply. Further observations tend to show that crescents tend to become spherical in about four minutes after the blood is drawn. This appeared to coincide with the time of blood coagulation. This spherulation is probably the result of osmotic changes and this in turn stimulates flagellation. There is no evidence, however, to support the idea that crescents ever flagellate in the circulating blood.

The Adrenalin Index of the Suprarenal Glands.—SYDENSTRICKER, DELATOUR, and WHIPPLE (*Jour. Exper. Med.*, 1914, xix, 536) have made a study of the adrenalin index, by which is meant the amount of adrenalin in milligrams per gram of the gland. Of the more accurate and sensitive methods for the determination of adrenalin Sydenstricker, Delatour, and Whipple have found the chemical colorimetric method the best. They have found that, as a rule, both adrenal glands in the same individual contain about the same amount of adrenalin per gram, the normal figures being 0.35 to 0.5 of a milligram, provided autopsy takes place shortly after death. In experimental work a low index was found, especially during the intoxication associated with intestinal obstruction. Animals, injected with a sublethal toxic dose of the poison found in closed duodenal loops, show after recovery a rise of the adrenal index to a point considerably above normal. The index falls to a low level as the result of liver poisons and is especially lowered after extirpation of the pancreas. It was found in pernicious anemia that the index is abnormally high, reaching in one case to twice the normal. This is of particular interest by reason of recent views put forward which indicate that the spleen and adrenal may be concerned in lipoid metabolism which is thought to be profoundly disturbed in this disease. In diseases of the kidneys, heart or bloodvessels associated with high blood-pressure no constant variation in the adrenalin index was detected.

A Strain of Spirochetes Isolated from the Central Nervous System.—NICHOLS (*Jour. of Exper. Med.*, 1914, xix, 362) describes a strain of spirochetes recovered from the cerebrospinal fluid in a case showing central nervous system symptoms in the secondary stage of the disease. The patient had had some treatment with salvarsan. The strain was secured by the injection of 3 c.c. into dogs' testicles. Morphologically the organism was of the typical thick type described by Noguchi. Of the animals injected, half showed definite local symptoms, and disorders of the eyes were especially common, notably keratitis. Similar injections made with the spinal fluids from five cases of general paresis were without positive results, but sixteen inoculations with an emulsion of the cortex secured from cases of paresis gave weakly positive results in five instances. Nichols points out that the first strain obviously is different from the others for it never manifested any neurotrophic characters and even when inoculated into the brains of apes it failed to produce lesions.

The Relation of the Blood Sugar During Carbohydrate Cures.—J. MENKE (*Deutsch. Arch. f. klin. Med.*, 1914, cxiv, 209), using Bang's method, has studied the effect of carbohydrate cures on the blood sugar in diabetes. The work was carried out carefully and in considerable detail and is summarized as follows: (1) Determined hourly, the blood sugar of the diabetic shows great variations which, without regard to the severity of the case, are influenced on the one hand by the taking of food, on the other by the activity of the kidneys, since it was found that a fall of the blood sugar was co-incident with the excretion of sugar by the kidneys. (2) The absence of parallelism between the intensity of the glycosuria and the height of the blood

sugar concentration is confirmed. The results obtained make it probable that the kidneys are actively concerned in the excretion of the sugar. (3) The fasting value is often surprisingly high. In cases of diabetes of moderate severity or in severe cases, the differences are too small to serve as a basis for determining the severity of the disease. (4) From his numerous observations, the author concludes that noon is the most suitable time of day for determining the blood sugar. There is no essential difference between wheat and oatmeal, either as regards the height of the rise in blood sugar or the rapidity of the rise. (6) In determining the result of a carbohydrate cure or the finer indications for the same, estimations of blood sugar as yet have been of little value.

On the Effect of Dietetic Cures upon the Blood Sugar in Diabetics.—L. Wolf and S. Gutmann (*Ztschr. f. klin. Med.*, 1914, lxxix, 394), using Bertrand's method, have investigated the glucose content of the blood in its relation to diet in the treatment of diabetes in thirty-five cases. They have made simultaneous studies of the sugar and acetone bodies in the urine. Six of the thirty-five cases were complicated by chronic nephritis. In the twenty-nine non-nephritic patients, the use of a carbohydrate-free diet invariably led to a decline in the blood sugar. The percentage of decrease was in general proportional to the severity of the cases. Four of the mildest cases attained normal quantities of sugar in the blood. The moderately severe and severe cases reached a certain level of blood sugar concentration after a time; in a general way the degree of concentration corresponded to the severity of the disease and was maintained with a rather striking consistency. The severe cases ordinarily showed a more marked rise in the blood sugar following the administration of carbohydrate than the mild cases. In a few patients having complications (four with pulmonary tuberculosis, two with cirrhosis of the liver and three with arteriosclerosis) no deviation from the results for uncomplicated cases was found. When the blood sugar level characteristic of a given case had been obtained, restrictions of the supply of protein (through vegetable days or fat days) in the severe cases caused no decrease in the blood sugar even though a glycosuria had been caused to disappear. Oatmeal days, when they caused any change at all, produced a slight rise in the blood sugar. In four patients who died in coma, it was found that there was a rise in the blood sugar even though hunger days preceded the withdrawal of the specimen of blood for examination. The rise must be attributed to disturbances of the intermediary metabolism. In the six patients with nephritis complicating the diabetes, the quantity of blood sugar varied with the variety of renal disease. All of the nephritics retained a hyperglycemia, even though the glycosuria yielded promptly to dietetic treatment, In none of them could a constant level for blood sugar be obtained. In two with arteriosclerotic contracted kidneys, variations in the quantity of sugar occurred quite independently of carbohydrates in the food. Two patients with chronic interstitial nephritis exhibited an accumulation of blood sugar and of nitrogen, though the urine remained sugar free. Finally, two patients with marked parenchymatous nephritis showed a definite rise after a preliminary fall in the blood sugar.

SURGERY

UNDER THE CHARGE OF

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Favorable Influence of Rœntgen-ray Stimulation in the Healing of Fractures.—FRAENKEL (*Zentralbl. f. Chir.*, 1914, xli, 1105) calls attention to previous communications on the favorable influence of the Rœntgen rays on pleuritic thickening, on the dissolution of adhesions in peritoneal tuberculosis and on its influence in some gynecological and other conditions. He has tried it in eight cases of fracture. In a two-year-old child with a comminuted fracture of the second phalanx of the little finger and a six-year-old boy with a similar fracture of the first phalanx of the index finger, from careful exposure to the Rœntgen rays, complete union was obtained in one case in eight days and in the other in ten days. In a third child with a transverse fracture of the radius and an oblique splintered fracture of the ulna, in six sittings with exposure of the fractures to the rays on all sides, the boy who was eight years old had a well-developed callus formation and consolidation of the fracture. The other cases which were in adults showed similar rapid healing. A one-and-a-half-year-old child had her thumb crushed under a heavy lid, a comminuted fracture of the first phalanx resulting. An attempt had been made to fix the fracture by sutures and silver clamps, and when the Rœntgen-ray treatment was begun, gangrene threatened. After repeated exposures the threatened gangrene subsided, but the child later fell on the thumb, the therapeutic effect of the Rœntgen rays was lost, and the thumb was amputated.

A Clinical and Experimental Contribution to Operation for Movable Kidney.—TICHY (*Deut. Zschr. f. Chir.*, 1914, cxxx, 17) made a study of this subject based upon an operation performed by König, as follows: The kidney was exposed by a lumbar incision. At the upper pole of the kidney in the fibrous capsule two frontal incisions about 1.5 cm. long were made, anteroposteriorly, about 4 cm. apart. Between the two the capsule was carefully undermined. Then from the external surface of the twelfth rib which had a well-developed periosteum, a strip of the latter was separated, about 1.5 cm. wide and 6 cm. long. It was divided anteriorly and the free end passed under the bridge of separated kidney capsule so that the surface of the periosteal strip separated from the rib lay in contact with the parenchyma of the kidney. The periosteum was then sutured on itself and to the rib so

that the kidney hung from it. The fibrous capsule was also split on the convexity of the kidney and its free edges sutured to the fascia. Gauze was lightly packed against the kidney and the wound closed to its lateral angle. A good fixation of the organ was thus obtained. Histological examination showed that the periosteum healed firmly to the capsule and kidney without any change in the structure of the kidney.

A Study of Malignant Tumors of the Testicle, Especially of the Epithelial Variety.—SÉKAGUCHI (*Archiv. gen. d. Chir.*, 1914, viii, 641) made a study of malignant tumors of the testicle based upon 32 tumors. The large-celled variety was the most frequent, 23 out of the 32 tumors being of this kind. The typical large-celled tumors of the testicle are epithelial and peculiar to the testicle. He believes that they are derived from the adult epithelium of the canals. The presence of cartilaginous tissue (existing in 2 cases) is explained easily by a metaplasia of the inflamed connective tissue with the appearance of hyaline tissue which presents all the forms of transition into cartilaginous tissue. Sarcoma of the testicle is rare (only one case among those of Sékaguchi). Simultaneous existence in the same testicle of carcinoma and tuberculosis was found in one case. There was no relationship between the two except that the tuberculosis may have developed secondarily to the carcinoma. The large-celled tumors developed usually between the thirtieth and fortieth years and between the fortieth and fiftieth years. The malignant epithelial tumors which resemble the adenoma in structure develop in infancy as well as in adult life. In 1 case this tumor developed in an old man. In 4 cases the tumor seemed to follow a traumatism. In 1 case it was related to an ectopic testicle.

The Treatment of Surgical Tuberculosis with Tuberculomucin (Wileminsky).—GOETZ and SPARMANN (*Mitt. a. d. Grenzgeb. d. Med. u. Chir.*, 1914, xxviii, 53) discusses his results with the use of this new specific preparation in 54 cases of ambulatory tuberculosis. These included 17 cases of lymphoma, 12 of caries, 11 of fungus, 10 of multiple foci, 1 of tuberculous epididymitis, and 3 cases in which the differential diagnosis between tuberculosis and lues was doubtful. He regards the tuberculomucin as an efficient aid in surgical forms of tuberculosis. Of 44 cases, of which only one showed a lung involvement of mild grade, in 22 the results varied from improvement to cure. In all, the first puncture reaction was considerable. One case healed after the first reaction but recurred nine and one-half months later. Of the remaining 26 cases, 11 remained uninfluenced and of these 3 showed only a slight first reaction. The others grew worse and of these only 2 showed a slight first reaction. One died a long time after the beginning of the treatment. The first reaction has a prognostic importance. Mild or absent reaction from the initial dose of 3 to 6 mg. of the tuberculomucin appeared in such cases as were therapeutically uninfluenced or succumbed to the tuberculosis within the next four months. A considerable or strong first reaction is observed in cases in which are favorably influenced by the treatment, although it may be seen in cases unfavorably influenced. Of the various forms, those with localization of the

tuberculous process in bones have the best prospect of healing. Tuberculous lymph nodes with apparently the same clinical symptoms, differ so much in response to the treatment that it is difficult to estimate clearly the value of this specific therapy in connection with this form of surgical tuberculosis.

Gastric Ulcers Remote from the Pylorus.—FAULHABER and REDWAY (*Mitt. a. d. Grenzgeb. d. Med. u. Chir.*, 1914, xxxviii, 150) discuss this subject on the basis of 52 cases operated on by Enderlens. Gastro-enterostomy was performed in 10 cases with one death; wedge-shaped resection in 3 cases without mortality; the Billroth II operation in 9 cases with one death; and circular resection in 30 cases with two deaths. In the histories of patients with gastric ulcers remote from the pylrous, the long duration and periodicity of the trouble is striking. Neither the history nor the clinical examination suffices for the localization of the ulcer, although the so-called "late pain," *i. e.*, a pain coming on three to five hours after eating, in a general way, speaks against a gastric ulcer remote from the pylorus. At times the Rœntgen ray examination for a topigraphical diagnosis of a deep ulcer of the body of the stomach, is of much importance. Gastro-enterostomy does not guarantee a sure cure of the ulcer nor a protection against dangerous complications, as perforations, hemorrhages, or jejunal peptic ulcers. The danger of carcinomatous change is not important and according to the writers' experience is not frequent. The radical resection methods deserve the preference in the treatment of these ulcers. Excisions or wedge-shaped resections are to be considered only when the more radical operation is prevented and are most successful when combined with gastro-enterostomy. Resection of the middle of the stomach gives especially favorable results and provides good physiological relations. The chemical conditions in the stomach are to be considered in the choice of the operation to be done. When the percentage of acids is high a considerable portion of the stomach should be removed. The Billroth II resection probably deserves the preference in these cases.

Tarsalgia.—MERRILL (*Surg., Gynec., and Obst.*, 1914, xix, 67) says that depression in power and tone of muscles combined with abnormal poise of the body in weight-bearing, results in strain of muscles, or groups of muscles, under greatest stress, produces relaxation of such muscles, and may cause spasm of opposing muscles or group of muscles. Under this condition of spasm the stress exerted on the os calcis by virtue of the relationship of the posterior tibial tendon to it, this bone is tilted upward relatively, producing a subluxation at the calcanio-cuboid and the astragaloscaphoid articulations, and the angle at the juncture of the tarsus and antitarsus is increased, producing a higher arch of the foot than normal. The pain resulting from this condition is due to the irritation in the muscle, it being manifested in the muscle and referred to the insertion of its tendons; it is also due to the strain produced in ligaments which enter into the compositon of the mediotarsal joint. He concludes: that such a condition is of static origin, generally combined with a systemic disturbance; that the condition of static subluxation of the mediotarsal joint has for its principal factor a contraction and shortening of the posterior tibial muscle, and is

generally associated with a depression of power and tone of the anterior tibial; that a fairly constant type of symptoms can be found; that it usually exists without a frank inflammatory process; that the condition will yield to prolonged rest or palliative measures, or both; and that a certain derangement of relationship of structures in the foot and leg and perversion of function, will produce a definite type of pain in the tarsus, or tarsalgia.

THERAPEUTICS

UNDER THE CHARGE OF

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The Treatment of Leukemia with Roentgen Rays and Benzol.—PULAWSKI (*Wien. klin. Woch.*, 1914, xxvii, 611) reports a case of severe lymphatic leukemia complicated with nephritis treated by a combination of benzol and roentgenotherapy. At the beginning of the treatment the hemoglobin was 30 per cent. and the white cell count was 425,600 with 90 per cent. of lymphocytes. After six exposures to the Roentgen rays during a period of nine days the white cells had dropped to 137,400 and the hemoglobin had risen to 36 per cent. During this time the lymph nodes and spleen diminished slightly in size. The patient was then given benzol in doses of 3 gm. a day during a period of sixteen days. At the end of this period the white cells have fallen to 8400. During the last nine days of the benzol treatment the patient had fever and the general condition became worse. Roentgenotherapy was resumed, four exposures being given over a period of nineteen days. The white cells continued to diminish in number so that two weeks after the discontinuance of the benzol treatment, the white cell count was 1100. However, the lymph nodes and spleen became perceptibly smaller. During the benzol period, Pulawski observed that the albumin and casts disappeared from the urine. This is noteworthy because the administration of benzol has apparently resulted in a number of instances, in distinct kidney irritation. Under combined iron and arsenic medication with a few exposures to the Roentgen rays, the white cells rose to 2600 with a fall in the percentage of lymphocytes from 90 to 40 per cent. and a rise in the neutrophiles from 10 to 49 per cent. The general condition improved as well as the blood picture; the lymph nodes diminished to normal size and the spleen became one-fourth of its former size. The anemia which was severe following the benzol course had greatly improved, the hemoglobin rising from 23 per cent. to 50 per cent.

Salvarsan and Neosalvarsan in the Treatment of Nervous Disease Due to Syphilis.—CRAIG and COLLINS (*Jour. Amer. Med. Assoc.*, 1914, lxii, 1955) say that while salvarsan has proved our most rapid

and most efficient agent in treating syphilitic nervous disease, the use of mercury, preferably intramuscularly, in the interval between doses of salvarsan, has proved highly desirable. They recommend the salicylate in a purified petroleum oil suspension for intramuscular injection. It is probable that the intermittent treatment will prove advantageous. By this is meant a succession of periods of treatment and periods of rest, each covering a number of weeks. The spirochete is thus not rendered immune or less sensitive to the specific therapy as may occur when treatment is continuous. In observing the progress of therapy and the decadence of the syphilitic process, the Wassermann reaction and the cell count are the most enlightening guides. Improvement in symptoms nearly always follows improvement in these. The author's state in their conclusions, that the nervous system may be the site of attack within a few weeks after the initial lesion. The earlier antisyphilitic treatment is instituted in syphilitic nervous diseases, the greater the probability of complete recovery.

The Diagnosis and Treatment of Cerebrospinal Syphilis.—STEWART (*British Med. Jour.*, 1914, 2783, 949) reports excellent results in the treatment of cerebrospinal syphilis by intraspinal injections of either salvasanized serum or of small doses of neosalvarsan combined with the intravenous administration of neosalvarsan. In every one of 11 cases of tabes the clinical signs improved, lightning pains and gastric crises subsided, sphincter control was improved, ataxia was frequently diminished, and in one patient the knee-jerks, previously absent, reappeared. In every case, save one, the lymphocytosis of the cerebrospinal fluid was markedly reduced. In this case, the cells of the spinal fluid increased slightly in number, but the lightning pains disappeared and ataxia completely cleared up. In speaking of the intracranial methods for introducing remedies with the cerebrospinal fluid. Stewart says that we should select those methods which are least likely to cause damage to the brain. For this reason cortical applications possess certain advantages over intraventricular injections. Further, when comparing intraspinal with intracranial administration, we have to bear in mind that a long series of treatments is necessary in order to properly treat a given patient, and we must consider whether we are justified in submitting a patient to the risks of repeated cranial operations, unless these can be shown to yield results which are materially better than those obtained by intraspinal injection. Stewart says that improvement in the condition of the cerebrospinal fluid is a useful index of arrest of the disease, but it must be remembered that, in general paresis at least, the cell count in the fluid may go down without any corresponding improvement in the mental symptoms. This is readily understood when one bears in mind that, even if the disease process be arrested, those nerve-cells and nerve-fibers which have been already destroyed, remain destroyed and cannot be regenerated. It is therefore of importance to select only those cases of general paresis which are in the early or toxic stage of the disease, before the cortex has become profoundly degenerated. The earlier the disease is recognized, the better are the prospects of improvement. Advanced cases with profound cortical degeneration are totally unsuitable. The most thorough method of attacking general paresis would be to

administer remedies concurrently by all three routes—intravenously, intraspinally, and intracranially. It is too early to claim that we yet possess a cure for tabes or general paresis, but Stewart believes that in suitable cases, much can be done to arrest both diseases. Whether such periods of arrest are permanent, time alone will show.

The Salvarsan Treatment of Progressive Paralysis.—RUNGE (*Deutsch med. Woch.*, 1914, xl, 998) compares the results obtained in the treatment of 175 cases of progressive paralysis with the older methods, mercury and the iodids, with those obtained by the use of salvarsan in 91 cases. Periods of improvement, which he designates as remissions, occurred only in 3.9 per cent. of 380 cases in which no treatment had been taken; in 9.3 per cent. of 140 cases treated with iodid alone; in 11.4 per cent. of 35 cases treated only with mercury; in 14 per cent. of 44 cases treated with a total dosage of 1 gm. salvarsan, and in 60 per cent. of 47 cases treated with larger doses of salvarsan, ranging from 1.0 to 10.5 gm. The percentage of remissions increased with higher dosage, which is shown by the fact that 28 per cent. of 72 cases given less than 3 gm. of salvarsan improved while 74 per cent. improved of the 19 cases given over 3 gm. of salvarsan. Of all patients who were not treated by salvarsan only 2 per cent. remained stationary for long periods of time while 30 per cent. did so after salvarsan. The general health of the patients treated with salvarsan improved remarkably as a rule, even when the mental symptoms were not favorably influenced. Runge advises the administration of salvarsan by repeated courses up to a total dosage of 5 or 10 gm. His practise has been to give repeated small doses at five-day intervals, but lately he has been convinced that an eight-day interval is safer. Some of the cases treated with salvarsan showed no improvement but most of these received only very small doses. However, he has found that even large doses of salvarsan fail to induce a remission in some cases and the disease, furthermore, may even grow more severe. Four cases of this series seemed to be made distinctly worse. However, the dosage had been only 0.2 to 1.5 gm., and Runge thinks that a more favorable result might have been obtained if the treatment had been more thorough. The author believes that the results are better when the treatment is begun in the early stages of the disease but good results may be obtained in a large number of cases, even when the symptoms are of long duration.

The Treatment of Leukemia with Benzol.—LIBEROW (*Therap. Monatsheft*, 1914, xxviii, 339) reports a case of myeloid leukemia treated successfully with benzol. The daily dose averaged from 1.5 to 2.0 gm., and toward the latter part of the treatment only 1 gm. The author emphasizes the fact that the administration of benzol should always be controlled by repeated blood and urine examinations. No unfavorable effect was observed on the number of red blood cells and the hemoglobin. The red cells rose and kept above 5,000,000 and the hemoglobin remained at 62 per cent. When the white cells had dropped to 13,000, Liberow reduced the dose of benzol and there was no further fall in the number of leukocytes. The patient was a woman, aged thirty-four years, with marked ascites due, according to the author,

to probably pressure on the portal vein by a myeloid tumor. The ascites disappeared which he attributes to absorption of the leukemia and consequent relief from pressure.

A Method by Which Remedial Agents may be Mingled with the Spinal Fluid.—BALLANCE (*Lancet*, 1914, clxxxvi, 1525) describes the method in detail by which he introduced salvarsanized serum on five occasions into the lateral ventricle; twice in two patients and once in a third patient. No ill effects have occurred from the injection of the serum but Ballance says that only a large experience could justify a claim that this method would cure or arrest cerebral or spinal disease, as typified in general paresis or tabes.

The Intrathecal Injection of Salvarsanized Serum.—SPENCER (*Lancet*, 1914, clxxxvi, 1531) concludes that the intrathecal injection of salvarsanized serum offers a hopeful method of treating and arresting the progress of tabes and other parenchymatous diseases of the spinal cord. Before its introduction these cases resisted all efforts and finally drifted into the asylums and work-houses. A cure of the lightning pains can almost definitely be promised. The injections, if carried out with especial aseptic care and technique do not endanger the patient's life. There is a great future before this treatment when further work has been done in perfecting it. The cure of a condition, which has previously baffled all efforts, merely because the pathology has not been fully understood, is now possible by working on definite scientific lines.

The Intrameningeal Treatment of Tabes and Cerebrospinal Syphilis.—BOGGS and SNOWDEN (*Arch. Int. Med.*, 1914, xiii, 970) reports eight cases of cerebrospinal syphilis treated by intrameningeal injections of salvarsanized serum. The technique used by the authors differed in one important point from that recommended by Swift and Ellis. They injected undiluted serum in amounts of from 25 to 35 c.c. after preliminary intravenous injection of 0.6 gm. of salvarsan. Thus the average single dose was about double that given by Swift and Ellis. The authors state that, from the results in their series of cases, it is evident that the intraspinal method is a step forward in the treatment of tabes and cerebrospinal syphilis. The patients were uniformly relieved from pain, and as far as locomotion was concerned there was a slow but definite improvement, in some instances amounting almost to restitution to normal. In this respect their cases seemed to do better than those of Swift and Ellis, perhaps on account of the larger doses of serum. The psychic effect of the treatment was also marked. The patients became encouraged by the quick relief of pain and the first improvement in the control of motion and were faithful in their efforts to use the legs and practice walking, stair climbing, etc. The nutrition also rapidly improved under these stimuli. The effect of the treatment on the cerebrospinal fluid was very striking. The cell count first fell to normal, the Wassermann reaction becoming negative some time after the cells were reduced. The Noguchi reaction seemed of less value as an indication of improvement, since such large amounts of globulin were injected into the spinal canal. The authors

observed that the Noguchi reactions were positive, in most instances, after the cell count and Wassermann indicated a normal fluid. In the cases treated with the undiluted serum the reactions were sometimes more severe than those reported by Swift and Ellis—pain in the abdomen, legs and rectum, with occasional nausea and vomiting or dizziness, and in a few instances a little fever. The do not feel, however, that these constitute any contra-indication to the larger doses of whole serum, especially in the light of the apparently greater benefit to the patient.

PEDIATRICS

UNDER THE CHARGE OF

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Salvarsan and Neosalvarsan in Hereditary Syphilis.—J. L. BUNCH (*Brit. Jour. Child Dis.*, 1914, xi, 297) shows that the arsenical preparations have not displaced mercury in the treatment of all cases of congenital syphilis. But where treatment has been omitted until the case is almost hopeless, or where the symptoms are exceptionally acute or fail to respond to mercurial treatment, quite brilliant results can be obtained by the use of arseno-benzol or its derivative. The mortality of congenital syphilitics is very high. Of 1700 syphilitic pregnancies 1535 resulted either in abortion or death before the end of the first year. This shows that a more successful method of treatment than by mercury is necessary in a large number of these cases. Bunch gives the results of salvarsan treatment by a large number of investigators and they show an improvement over the mercury treatment alone. Neosalvarsan is more simple of preparation than salvarsan, but several important points are brought out in its application. The solution must be injected as soon as prepared. A sterile 0.4 per cent. saline solution made of freshly distilled water is best. The dose administered should be 0.15 gram. per kgrm. of body weight. The median, basilic or external jugular veins may be used for the intravenous method in young children. It is wise to start with small doses in all cases. Absolute immobilization of the patient is one of the great difficulties. It is unwise to inject neosalvarsan into patients with marked cerebral involvement or kidney disease. The drug is especially valuable in cases with skin lesions. In babies it is rarely necessary to use more than two or three injections, if more are necessary the intramuscular method should be used. The Wassermann reaction is of little use as a guide, usually remaining positive in spite of treatment while active symptoms are present. For rapidity of action and power of healing up syphilitic symptoms nothing superior has up to the present been discovered.

Auricular Flutter in Acute Rheumatic Carditis.—G. A. SUTHERLAND (*Brit. Jour. Child. Dis.*, 1914, xi, 337) describes an abnormal rhythm of the auricles in acute rheumatic carditis. Prognosis in this

condition is determined more or less by the degree of involvement of the myocardium. Another factor leading to cardiac failure is an abnormal rhythm of the heart. In acute carditis the ventricular rhythm is usually regular, as tested by the apex beat, pulse or tracing from the radial artery, whereas in the majority of cases abnormal rhythm is developed in the auricles and not in the ventricles. Sutherland mentions two cases in which an abnormal rhythm of the auricles was recognized only on taking a venous tracing in the neck. The auricular rate was greatly accelerated while the ventricle did not share in the acceleration. In other words, a number of auricular contractions failed to be followed by ventricular contractions. In both cases the auricular and ventricular rates were perfectly regular. The author explained the condition as probably due to ventricular inability to follow the auricle on account of the rapidity of the auricular beat, and not as due to heart block. If further investigation shows a disordered rhythm frequently present in acute carditis the treatment will be more hopeful, as a disordered rhythm of this nature responds more readily to digitalis than will a ventricle weakened by acute inflammation or toxemia.

OBSTETRICS

UNDER THE CHARGE OF

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Vicarious Menstruation Ceasing during Pregnancy.—HIRSCHBERG (*Zentralblatt f. Gyn.*, No. 26, 1914) reports the case of a Hungarian coming to live in Berlin, who menstruated not only in the usual manner but also through the breasts. When menstruation was established the vicarious discharge was at first watery in character. After the seventeenth year it became bloody, was attended by pain, began one or two days before the usual discharge and lasted one or two days longer. The discharge of blood was greater from the right than from the left breast. It could be increased by pressure, but escaped spontaneously. The patient had had two abortions, one at five and one at four months. During these pregnancies all menstruation ceased. After the last pregnancy the discharge from the breasts suddenly ceased without known cause and without disturbance.

The Danger of the Tampon in Placenta Previa.—REINHARDT (*Zentralblatt f. Gyn.*, No. 26, 1914) reported before the Gynecological Society of Dresden, 276 cases of placenta previa treated in the Dresden Clinic. He had observed the relative condition of those patients treated by the tampon and those without the tampon. Among those not treated by the tampon the morbidity during the puerperal period was 34 per cent., and the mortality from puerperal septic infection

0.7 per cent. Among those treated by the use of the tampon the morbidity was 53 per cent., the mortality from sepsis 4.3 per cent. From this and other experience he would abandon the use of the tampon even as a temporary measure to control hemorrhage until a patient could be brought into hospital. He would prefer to lessen bleeding by giving a full dose of morphia hypodermically. In discussion, Peters declared that the practising physician was not able to apply a tampon in a skilful and aseptic manner. He believed that the use of the bag in good hands, to temporarily control hemorrhage, was safer than a tampon. Richter had never seen the bag or tampon efficient in controlling hemorrhage. He believes that morphia first, and as soon as possible the emptying of the uterus, are the best means. Kehrer did not believe the aseptic use of the tampon possible outside of hospital.

Pernicious Nausea in Pregnancy.—Bondy (*Monatschrift f. Geb. u. Gyn.*, Band 39, Heft 6, 1914) describes the case of a married primipara, aged twenty-eight years, who suffered from pernicious nausea and vomiting in the early months of pregnancy. It seemed possible that some disease of the stomach was present and the patient was referred to the Medical Clinic in the Breslau Hospital, where the urine and blood were examined, the stomach irrigated, the patient fed by rectal injection and given oxalate of cerium and tincture of iodin by mouth. There was no improvement and the patient steadily lost weight. She was then returned to the obstetric clinic where 10 c.c. normal serum of pregnancy was injected into the muscles. Improvement immediately followed, and 15 c.c. of pregnancy serum was injected in the gluteal region. The patient's improvement was maintained, she was able to take solid food, recovered and was subsequently confined in the Clinic in normal labor with living child. Freunds has collected 8 cases of pernicious nausea treated by pregnancy serum, 6 of whom recovered. It is curious to observe that some of these recoveries followed the use of serum taken from the horse, and others the injection of Ringer's solution only. It seems difficult to believe that the introduction of the small quantity of alkaline substance in Ringer's solution could materially influence so serious a condition. Bondy also reports the case of a patient evidently toxemic with pernicious nausea, who died in spite of treatment including the interruption of pregnancy. The autopsy showed characteristic changes in liver and kidneys. As regards the frequency of genuine pernicious nausea, in the Breslau Clinic in 10,000 cases of labor, 21 of pernicious nausea have been observed. In the Munich Clinic Baisch found 20 cases in 20,000 pregnancies. In von Herff's Clinic, in 17,000 pregnancies, 30 cases of pernicious nausea. Contrary to usual opinion, the majority were married and multiparæ. The case of a multipara is reported who had once been treated for pernicious nausea by interrupting pregnancy. She returned and again pregnancy was interrupted by dilating with solid dilator, curetting with blunt curette and irrigation with alcohol. This was followed by collapse with slow recovery in coma. Two hours after profuse hemorrhage occurred partly controlled by the tampon. The patient slowly improved and left the Clinic against advice on the ninth day. On the day follow-

ing she was taken with unconsciousness and convulsions, brought to the medical Clinic with fever, albumin in the urine, casts and indican, with severe convulsions and spasm. Death speedily followed. Autopsy showed diphtheritic endometritis with thrombosis of both spermatic vessels, the heart muscle degenerated, the liver altered and hemorrhage into the substance of the kidneys. The writer draws attention to the many theories advanced to explain this condition, and inclines to consider it as toxic. In the matter of prognosis, each case must be studied individually, and the entire collection of symptoms critically reviewed.

The Biologic Test for Pregnancy.—PUPPEL (*Monatschrift. f. Geb. u. Gyn.*, Band 39, Heft 6, 1914) in 27 samples of blood from pregnant patients made 32 tests. In 16 the specimen came from a pregnant patient and of these 12 by first test gave a positive result. Several cases of pregnancy or abortion first gave a negative response, followed shortly by positive. In several cases some fault of the apparatus or inaccuracy in the technique was found. In 2 cases of the non-pregnant a positive result was followed later by a negative, and in 1 case of positive pregnancy a negative result persisted. In a case of abortion between the second and third month, where the uterus was cleared, a negative result was obtained two days after the treatment. A case of gonorrhea, 1 of two tuberculous pyosalpinx, 1 of amenorrhea after puerperal sepsis and one of beginning menopause gave negative results. He ascribes variations and failures to faults in technique rather than to an essential lack in the method.

Recovery After Shotgun Wound of the Abdomen and Pregnant Uterus.—DAVIS (*Amer. Med. Assoc.*, July 18, 1914), reports from the Massachusetts General Hospital of Boston, a case of an Italian woman, four months pregnant, admitted to Hospital about thirty minutes after receiving a shotgun wound of the abdomen at close range. On admission there was an irregular lacerated wound in the right lower abdominal quadrant. Two fists could be introduced into the abdominal cavity. Through this were protruding about four feet of small intestine. There was considerable oozing of blood. In the right groin about two inches below Poupart's ligament were two small punctured wounds. No powder burns nor wounds of exit could be found. There was no vaginal hemorrhage; the patient was shocked but the pulse and temperature were normal. Sterile towels wet with hot salt solution were immediately placed over the intestines. Morphin, $\frac{1}{4}$ gr. and camphorated oil 30 mm. were given hypodermically, and one pint of normal salt solution injected under the right breast. At operation about 40 small perforations were found in the protruding bowel and in sone places the shot could be palpated in the wall of the bowel. Through some of the perforations exuded gas and frothy fecal matter. The perforations were infolded with purse-string sutures of silk, several being included in one suture in many instances. At one point this caused constriction of the lumen of the bowel, but gas could be squeezed through. The intestines were carefully washed with warm salt solution and replaced. Considerable blood was found in the abdomen. The uterus showed a tear four inches long in the anterior wall, through

which protruded an umbilical cord leading to a four months' fetus, lying loose in the abdominal cavity. The placenta was removed manually from the uterus and the uterine wall closed with interrupted chromic catgut. The patient was given ergot hypodermically. No other abdominal injury was found. The abdomen was irrigated with warm salt solution and a cigarette drain placed in the right iliac fossa, and one in the pelvis. The abdomen was closed with loose approximation of the skin, and two additional cigarette drains in the subcutaneous tissue. The patient's condition at the end of operation was remarkably good and she was placed in the ward in Fowler's position, with rectal saline instillation. The patient made a steady and uninterrupted recovery. The skin edges of the wound sloughed and were repaired later under local anesthesia. A few shot were removed from the superficial tissues of the groin and abdominal wall. These corresponded to about No. 7 bird-shot. In about six weeks after the operation the patient was sent to the convalescent home, from which she went two weeks later in good condition. It is interesting to observe that the direction of the wound in the abdominal wall was transverse, while the rupture of the uterus was longitudinal, and there were no marks of shot wounds in the uterus. Apparently the rupture of the uterus resulted from sudden violent contraction at the moment when the patient was shot.

The Antitrypsin Test in Obstetric Cases.—HEINEMANN (*Monatschrift f. Geb., u. Gyn.* Band 39, Heft 6, 1914) has applied antitrypsin solution test in 25 cases of pregnancy. In 15 a positive reaction was obtained, which was above the average, and in 10 a positive, an average reaction. A second 25 cases were studied, in which there was some doubt about the clinical signs of pregnancy; but 11 of these were available for later study. In 3 the antitrypsin test showed increased reaction, although there was no pregnancy. In 8 cases where the clinical signs pregnancy were present the antitrypsin test agreed. In 54 pronounced cases of carcinoma there were 4 negative results, and 3 of these were in cancer of the breast. In 7 cases where the test was positive clinical signs were not, and it was found that some other disease as tuberculosis, icterus, cirrhosis of the liver, or other constitutional disorder was present. In 12 cases of abnormal conditions of the pelvic organs, if fever was present the test was positive, in others negative, and in a case of myoma negative. Of the 50 pregnant women examined the clinical signs of pregnancy and the result of the test agreed in 47, and the conclusion is reached that the test is of decided practical value. A solution of trypsin 1 per cent. is used. and as an albuminoid controlled soltuion 2 per cent. of casein. The strength of the trypsin solution in effecting albuminoid is obtained by experiment, and this finally can be tested by an alcoholic solution of acetic acid which gives no precipitate, showing that the ferment has completely digested the albumin. Ferment and albuminoid are then tested in normal serum to observe the results. As a third step the serum of the patient who is studied is tested and compared with the serum of a patient positively known to be pregnant.

GYNECOLOGY

UNDER THE CHARGE OF

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Pelvic Varicocele.—In a paper read before the recent meeting of the American Medical Association, DARNALL (*Jour. Amer. Med. Assoc.*, 1914, vol. lxiii, p. 391) expresses the opinion that the existence of varicosities of the veins of the broad ligaments is a much more common condition than is generally recognized, and states in support of this that he has seen as many as ten cases in the past year. He thinks that in many instances women complaining of the following characteristic symptom-complex: aching pains in the pelvis and back, with dragging sensations, relieved by lying down, worse on standing or walking and at the menstrual periods, often with increased or too frequent menstruation; in other words, women suffering from all the symptoms of pelvic engorgement and irritation, but without any demonstrable lesion upon examination, are in reality victims of this condition of pelvic varicocele. The usual fate of these women is to be consigned to the large class of neurotics, whereas there is a real physical basis for their trouble. Darnall thinks the veins of the broad ligaments may become much enlarged during pregnancy, this being the most frequent origin of the condition. He recently had the opportunity during a Cesarean section of observing a worm-like tortuous bunch of veins in the right broad ligament, the main trunk being as big as the index finger; he believes that if after delivery involution of the uterus is not perfect there may be a failure on the part of these overdistended veins to regain their size and tone. This state of affairs is generally seen, therefore, in parous women, especially those with impaired perineal support, but it occasionally occurs in single women with retrodisplacements of the uterus. The history of these cases is usually that they have been to several physicians without relief, having in many instances finally had the abdomen opened for supposed intestinal kinks or membranes, even then the true cause being overlooked unless the veins of the broad ligament are carefully inspected. The diagnosis must of necessity be largely one of exclusion, based on the presence of the above mentioned symptoms, *without any gross pathologic lesion* that can be detected. The only satisfactory treatment is double ligation of the veins, with excision of the intervening portion. The author reports a number of cases in which this procedure was followed by complete relief of symptoms for varying periods up to one year after operation, this being the longest time for which any of the cases have been followed.

Cystoscopy in the Presence of Vesical Fistula.—The great difficulty of carrying out a satisfactory cystoscopic examination when there is a fistulous opening in the bladder wall is well known; unless the fistula be extremely small, the fluid used to distend the bladder immediately runs out, and no view can be obtained. Attempts to close the leak

temporarily by tightly tamponing the vagina are usually but indifferently successful at best, and fail completely when the fistula leads into the cervical canal. One author has suggested in such cases surrounding the cystoscope with a thin rubber condom, the cystoscope and condom being passed together into the empty bladder; the condom being then filled with fluid distends the bladder and spreads itself out on its internal surface, the examination taking place through this fairly transparent, thin sheet of rubber. It goes without saying that in many instances this maneuver is more ingenious than satisfactory. As KUBINYI (*Zeitschr. f. gyn, Urol.*, 1914, v, 1) points out, however, in certain cases of large fistula, situated in the upper portion of the bladder, a preliminary cystoscopic examination may be of the greatest importance in determining the exact location, shape and extent of the opening, and thus in laying out the plan of operation. In an extremely complicated case of this character he was able to obtain a perfectly satisfactory view of the interior of the bladder by means of the following procedure: The patient was a woman, aged forty years, who had passed through several difficult labors, and had acquired as a result both a rectovaginal and a vesicocervical fistula, the latter being of very considerable extent. After trying various of the methods mentioned above without success, Kubinyi placed a temporary purse-string suture about the vagina above the rectal fistula, using for this purpose novocain-adrenalin local anesthesia. By thus closing off the vagina, he formed of its upper part a closed pouch communicating through the cervical canal and fistula with the bladder, which he was then able without difficulty to fill with fluid, and thus to perform a perfectly satisfactory cystoscopic examination and determine exactly the conditions with which he had to deal. A few days later, under general anesthesia, he was able to close the fistula without great difficulty, and without any danger of injuring the ureters.

Treatment of Amenorrhea by the Intra-uterine Pessary.—A word in favor of this much discussed and (by many writers) much condemned method of treatment has recently been spoken by RIECK (*Zentralbl. f. Gyn.*, 1914, xxxviii, 1061), who reports his results in 22 cases of amenorrhea and oligorrhea, usually associated with some dysmenorrhea, but *not* due to chlorosis, severe anemia, or other constitutional disturbances. In all instances the condition came on at some time subsequent to puberty, and belonged in the class considered by Rieck as "idiopathic," *i. e.*, due to functional disturbances of the uterus, ovaries, or both. The patients varied in age from nineteen to forty years; in seven cases the condition was one of true amenorrhea, and in twelve of scanty menstruation (oligorrhea). In all these a complete cure was obtained by the use of the uterine stem, not only while the stem remained in place, but also after its removal for as long as it was possible to keep track of the patients. The remaining three cases were failures. In most cases the instrument was left in place for as long as from eight to twelve months, although the desired effect was usually produced much sooner. Two patients carried the stem six and eight years respectively, since they felt perfectly well, and did not return to the clinic for its removal. In one instance the instrument caused pain, and had to be removed after two weeks; in another

patient, a young girl with narrow vagina, the disk-like end of the stem caused some irritation of the vaginal wall, and the women who wore the pessary for eight years had an abortion; beyond these, no deleterious effects were observed. The author believes that most of the condemnation which in the past has been heaped upon the intra-uterine stem-pessary has been due to the faulty construction of the instruments used, as a result of which they were difficult to maintain in place, or caused injury to the vagina or uterus. The instrument which he uses is made of aluminum; it has a disk-like expansion which remains outside the portio vaginalis, a narrow portion which corresponds to the cervical canal, and a bulbous inner extremity, which lies in the body of the uterus and is tightly gripped by it. He lays great stress on the importance of this latter point, and says that in introducing the pessary dilatation should be carried only to the point that will just permit of pushing the bulbous end through the cervix, and that the instrument used must be of such size that the bulb will lie well above the internal os. He has found no advantage in having the stem perforated. When used properly, and the patients are kept under observation, the author believes the dangers following the use of this type of pessary to be negligible, and says that in an experience of many years he has never seen inflammatory trouble occur; he thinks that in the case where this has been reported, a sufficiently accurate diagnosis had not been made beforeheand.

OTOLOGY

UNDER THE CHARGE OF

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Otospongiosis Otosclerosis.—Chronic progressive impairment of hearing is usually the result, according to LERMOYEZ (*Ann. des Mal. de l'Oreille*, xi, 5), of chronic non-suppurative processes originating in the tympanum or in the labyrinth, not infrequently the lesions are complex in their localized origin and the impairment of hearing may be characterized as tympanolabyrinthic in its causation. Earlier writers have noted the frequency of this form of lesion and determined its individual characteristics, and have attributed its evoked symptoms to a fixation or ankylosis of the stapes. Toynbee revolutionized otology by demonstrations of structural changes in the middle ear, which explained a large proportion of the so-called cases of nervous deafness as due to an impairment of mobility in the sound-transmitting apparatus through stapedal ankylosis, and von Troeltsch, confirming his observations, applied the term sclerosis to all the non-suppurative adhesive processes within the tympanum whatever their origin. It remained for Politzer, many years later, to demonstrate the real cause of many of the cases of gross impairment of hearing, slowly progressive, which had been included in the general mass of fixation changes of

tympanic origin, as due to a distinctive cause essentially characterized by changes in the bony capsule of the labyrinth, not an otitis but an osteitis definitely individualized but entailing, in most instances, as one of its secondary results, a fixation of the stapes and, in other instances, implication of the membranous labyrinth. These defined conditions continued to be confused, in otological nomenclature, under the title otosclerosis, until Ostman suggested for the pathological condition described by Politzer the name otospongiosis which has the definitive advantage of both clarity and precision since it portrays a progressive change which occurs in the osseous capsule of the labyrinth itself without implication of the petrous portion of the temporal bone, a condition due to the embryologic differentiation of the corresponding structures. The changes incident to this disorder in the bony labyrinthine capsule are divisible into three stages: (1) The interior of the Haversian canals becomes filled with an osteoid granulation tissue which substitutes itself for the original bony structure and supplants it. (2) This osteoid tissue disappears in its turn by lacunary absorption constituting temporarily in effect an intermediate bone. (3) Finally the medullary resorption cavities become filled with a third bony tissue, definitely new bone but passing through two evolutionary stages, at first compact and later becoming spongiform with resultant deformation of the labyrinthine capsule, the evolution constituting an osseous metaplasia and justifying the title given by Manasse, ostitis chronica metaplastica. This transformation procedure has a predilection area, which is, however, by no means invariable. The preferential initiation region is that of the oval window, more especially anteriorly; its further propagation is either by continuity or by the appearance of isolated lesions affecting other portions of the capsule, but preferentially the region of the oval window without implicating the niche walls. There is a remarkable symmetry in the binaural exhibition of the locality of the lesions, not only those in which the region of the stapes is the main point of attack, but those in which the locations are multiple and aberrant. These observed facts are in accordance with the subjective symptoms as regards the hearing which varies in its manifestations according to the labyrinthine locality invaded, with the stapedal type predominant, and explains the symmetry of defect of hearing in the two ears in this class of cases. The predominance of the pathological changes in the region of the oval window results in the clinically long recognized anchylosis of the stapes, not a fibrous or adhesive fixation such as occurs sometimes in non-suppurative middle ear disease or as an after result of a suppurative process, but a bony fixation due sometimes to invasion of the spaces of the annular ligament by osseous tissue, to thickening and enlargement of the base plate which impairs mobility and to a fixation consequent upon osteophytic invasion of the oval niche, and while bony fixation of the stapes is not a constant accompaniment of otospongiosity, its frequency is such as to make the acoustic evidence of this condition clinically valuable toward the diagnosis of the intracapsular abnormality. Changes in the membraneous labyrinth, especially the cochlea, are almost constantly observable as a consequence of the bony fixation of the stapes, but vary considerably in degree and in localization; they are, commonly, minute atrophic lesions in the cells of the spiral ganglion

of the modiolus and the terminal branches of the cochlear nerve in their distribution to the ganglion cells of the organ of Corti. Impairment of hearing due, at first, merely to an obstruction to the passage of the sound waves, by fixation of the stapes, becomex later, in the progress of the disease, complicated by impairment of function of the terminal nerve end apparatus itself with the production of a clinically, mixed type. The primary causes of otospongiosity are practically as yet unknown; one fact, however, is, according to Manasse, indisputable, namely, the absence of a local cause. Among general causes there are two theories which merit consideration; one that this peculiar lesion has its origin in specific disease either immediate or remote, and the other that it is directly referable to a lesion of the hypophisis productive of osseous distrophy analogous to the more exaggerated changes in acromegaly; the former theory has been long supported and combatted in the literature of the subject, the latter, proposed by Denker, is still under advisement and the subject of investigation; the influence of heredity and the observable effects of gestation and of exposure to inclemency and to cold evidence the measures of precaution which should be observed in these cases. On objective examination the drum head, and middle ear, as seen through the transparent membrane, present a normal appearance with exception of the roseate blush of the tympanic mucosa on the promotory and in the region of the oval window not always a constant symptom but, as noted by earlier observers, periodic in women with the access of menstruation and, in both sexes, incident to overfatigue or exposure to low temperature. Subjectively there is a decrease in duration of all tones aërially conveyed a prolongation in duration of hearing by bone conduction, a marked degree of depreciation in hearing for tones of low pitch and for the human voice, the hearing for tones of medium high pitch remaining contrastingly good, in the earlier stages. Later this hearing for high tones also decreases and the subjective circulation sounds become more pronounced. In the earlier stages of the labyrinthine change, with the increase in hearing by bone conduction, the voice of the patient, in speaking, while well modulated, is deficient in volume and only later becomes defective in its tone value as the nerve apparatus of the membranous cochlea becomes affected. Virtually otospongiosity is, as the author affirms, the *noli me tagere* of otology; it is a progressive and incurable disease, the evolution of which is usually enhanced by the local treatment regarded as applicable in cases of impairment of hearing incident to the chronic progressive nonsuppurative diseases of the middle ear. Its true nature is usually determined subjectively only after the labyrinthine disease has well advanced and when there remains for the patient only the application of hygienic arrestive measures and the acoustic reëducation. Local treatment by means of inflation of the middle ear, massage of the tympanum and operative interference in the nose and nasopharynx are all contra-indicated, the local stimulation and the adjacent local irritation incident to these measures serving only to stimulate the progress of the labyrinthine change. The general hygiene is prophylactic if it has for its basis as near an approach as possible to physiologic living, avoidance of extremes of temperature, especially of cold, moist air, open-air exercise in moderation, prolonged sleep and the avoidance of excitement and of

fatigue. Acoustic reëducation should be sought rather through the instrumentality of the human voice than by mechanical means, the understanding of speech visually should be encouraged as a compensatory measure, and the patient taught to live within the measur of the acoustic handicap.

The Clinical Pathology and Therapeutics of Subjective Noises in the Ear.—The importance of recognizing the existence of other than purely aural causes as factors in the production of this variable, and often burdensome symptom is emphasized by STEIN (*Monatschrift f. Ohrenheilkunde*, vol. xlviii, p. 5) in an extended and critical review of the literature of the subject coupled with the results of his own observations in a large number of cases, in which, in addition to a careful estimation of the aural condition, a thorough general examination was made with especial estimation of the influence exerted by changes in blood-pressure and by determinable abnormalities in the circulatory system. The general examination of patients suffering from severe subjective noises which have not yielded to the ordinarily remedial aural treatment shows, in a large proportion of the cases, subjective and objective abnormalities in the circulatory system and especially in the blood-vessels. The prominent disturbances of the circulatory system are either functional or organic, and among the latter arteriosclerosis plays the dominating role; the frequent occurrence of pathologic circulatory conditions in patients having subjective noises in the ears and the number of cases in which this symptom leads to the determination of such pathologic conditions, especially conditions resulting in increase in blood-pressure, emphasizes the importance of estimation of such conditions as factors in the cause of the subjective symptom. Disorders of the circulatory apparatus which may cause subjective noises are: (1) Vasodilatation in the arterioles, less frequently in the veins, within or in the neighborhood of the ear with an increased circulatory friction sound audible by auto-auscultation. (2) Imperfection in function of the heart and bloodvessels with consequent effect upon the activity and nutrition of the auditory nerve system. (3) Repeated or persistent narrowing of the arteries supplying the region inclusive of the auditory nerve and its distributions either as a result of vasoconstriction or of the narrowing of the vascular channels by sclerotic changes involving disturbance of nutrition and consequent degeneration. In the first class of cases the subjective noises would, under normal conditions, be comparatively unnoticed, but, with increased hearing by bone conduction, consequent upon impairment of sound transmission in the middle ear sound conducting apparatus, or with increased blood pressure, and correspondingly pulsatory increase in the region of the ear, the sounds become audible. In the second and third class of cases are to be found the subjective noises which are the product of an irritation in, or a degeneration of, the terminal auditory nerve apparatus. The classes of cases here enumerated are by no means to be regarded as individually delimitable but include often combinations of conditions and of symptoms; all illustrate the importance of the early recognition of general conditions of which the subjective aural symptom is an indication which it is important to regard as a possible precursory indication of a general condition and not a merely aural cause.

PATHOLOGY AND BACTERIOLOGY

UNDER THE CHARGE OF

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Pathological Rarities.—At the meeting of the German Pathological Association in Munich (*Centralbl. f. Allg. Path. u. path. Anat.*, Bd. 25, No. 10, May 31, 1914) VON HANSEMANN reported two cases of the formation of small shot-like masses in the appendix. Of the size of caviar, the masses were round, translucent, with a whitish core, and consisted of mucin and colloid. The appendix was enlarged, closed toward the cecum, perforated toward the peritoneum, and large numbers of these concretions were present. They are presumably found in widened mucous glands of the lining membrane, whence they are subsequently expelled. ROBERT MEYER showed a teratoma of the umbilical cord, which he describes as unique. Of the size of a child's head, it was situated in the course of the cord, 10 cm. from the cup of an umbilical hernia; it consisted for the most part of glia and entodermal parts, hair was absent, skin and sweat glands in small amount, as were bone and cartilage. Myxomas are found occasionally at the insertion of the cord, but this appears to be a very unusual tumor. Meyer considered it of somatic origin.

The Serum of Cold-blooded upon Warm-blooded Animals.—JURGELUNAS (*Zeit. f. Hyg. u. Infekt.*, 1914, Band lxxvi, Heft 3) details a number of operations upon the effects produced by the sera of cold-blooded animals upon warm-blooded. He found that serum from the eel, drake, pike, carp or frog are poisonous for mice, guinea-pigs, and rabbits, as evidenced by marked signs of malaise and fall in body temperature; the eel serum was more potent than the others above named. Such serums possess hemolytic powers over the blood corpuscles of man, and of the sheep as well as over the corpuscles of the rodents, but the poisoning properties are only indirectly connected with the hemolytic power, which is quickly and in great part lost by heating the serum.

Room Disinfection Against Tubercle Bacilli.—LAUBENHEIMER (*Zeits. f. Hyg. u. Infectionskr.*, Bd. 77, Hft. 1, 1914) has carried out a careful series of experiments with regard to the determination of proper means of disinfecting rooms infected with tuberculosis. Formaldehyde, sublimate 1 in 1000, and 5 per cent. cresol-soap, after nine hours application, are not sure disinfectants of dried sputum even in a thick layer, and of these formaldehyde is the best, if it be upon a hard surface that is not porous. Combinations of the above methods do not give any increased effectiveness; the soap or sublinate may even coat over the dried

sputum and thus protect it in some degree from the formalin. Formaldehyde and "phobrol"—apparently a new proprietary of the cresol group—give a more useful combination. Sublimate 1 in 200, and phobrol in 2 per cent. solution, if allowed five hours to work prove effective in killing the bacteria even in a thick layer.

The question is an important one; it is not known to the reviewer that any more effective method is used, in Canada at least, for the disinfection of rooms than the usual formalin method; and if it be quite ineffective for the killing of tubercle bacilli, the sooner the fact is generally known, the better for all persons concerned.

Hypertrophy of the Right Ventricle from Unusual Cause.—SCHÜTTE (*Centralbl. f. Allg. Path. u. path. Anat.*, Bd. 25, No. 11, June 15, 1914) describes a remarkable hypertrophy and dilatation of the right side of the heart occurring in a woman, aged seventy-four years, without general arteriosclerosis. The heart was large, death had occurred from cardiac insufficiency, but the enlargement was to a great extent right-sided. The cause of this was a remarkable inflammatory increase of the intima in the small branches of the pulmonary artery, especially those having a diameter of a quarter of a millimeter or less. There was an entire absence of emphysema or of disease of the valves of the left side of the heart, such as is usually found to cause arterial change of this nature. Several parallel cases have been recorded, usually under the title of idiopathic hypertrophy of the right ventricle.

The Intravascular Formation of Giant Cells.—WHITMAN (*Jour. Med. Res.*, January, 1914) has had opportunity of studying a giant-cell endothelioma of the gum and has been able to observe the intravascular formation of giant cells which has previously been observed in sporotrichosis. Whitman finds proliferation of endothelium of the bloodvessels, the nuclei proliferating from one side into the lumen surrounded by hyalin coagulum. The intima of the vessel may be recognized, still surrounding a lumen that is not yet completely obliterated, and blood cells may be seen in the process of phagocytosis of the new-formed cell. A subsequent thrombosis may destroy the outline of the vessels, and from this time the giant cell seems to lie in the tissue spaces. It owes the characteristic grouping of its nuclei to the fact that the proliferation of nuclei has occurred from one spot and has infiltrated a mass of preformed protoplasm. Whitman has also observed this mode of formation in blastomycosis and tuberculosis, although he does not consider that it is the only, or even the usual method.

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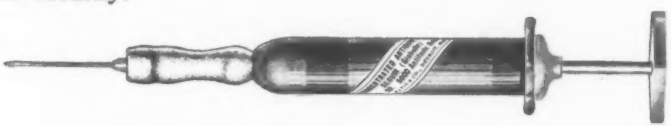

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